East Midlands Gateway
Phase 2 (EMG2)

Document DCO 6.14A/MCO 6.14A

ENVIRONMENTAL STATEMENT

Volume 2 Technical Appendices

Appendix 14A

Geotechnical Preliminary Risk Assessment (EMG2)

July 2025

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The East Midlands Gateway Phase 2
and Highway Order 202X and The East Midlands Gateway
Rail Freight and Highway (Amendment) Order 202X

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SEGRO

East Midlands Gateway Phase 2, Land south of East Midlands Airport, Derby

Geo-environmental and Geotechnical Preliminary Risk Assessment

August 2024

FAIRHURST

CONTROL SHEET

CLIENT:	**SEGRO Plc**
PROJECT TITLE:	**East Midlands Gateway Phase 2, Land South of East Midlands Airport, Derby**
REPORT TITLE:	**Phase I Geo-environmental and Geotechnical Preliminary Risk Assessment**
PROJECT REFERENCE:	**148749**
DOCUMENT NUMBER:	**R5.0**
STATUS:	**FINAL**

Issue & Approval Schedule	REV 0	Name	Signature	Date
	Prepared by	Dicken Maclean	Signed copy held on file	05/08/24
	Checked by	Christo Dunston	Signed copy held on file	05/08/24
	Approved by	Christo Dunston	Signed copy held on file	05/08/24

Revision Record	Rev.	Date	Status	Description	Signature	
					By	
					Check	
					Approve	
					By	
					Check	
					Approve	

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APPENDICES

1.0 Introduction

1.1 Background

Fairhurst have been commissioned by SEGRO Plc (the 'Client') to undertake a Phase I Geo-Environmental and Geotechnical Preliminary Risk Assessment with respect to the proposed development, located on a plot of land south of East Midlands Airport, Derby, approximate postcode DE74 2TN, National Grid Reference SK 46069 24972. The site location and illustrative masterplan is provided within Appendix A.

This report has been prepared in support of a forthcoming Development Consent Order (DCO) application for the development of the site as warehouses, ancillary offices, associated services, access, parking and landscaping known as East Midlands Gateway Phase 2 (EMG2). The above part of the site is referred to as 'The main site' in the DCO application. The remaining part of the application site that is situated within the EMG1 site that includes the Rail Freight Interchange expansion/upgrade and the land required to undertake highway improvement works to accommodate the proposed development are submitted under separate cover.

1.2 Objective

The objectives of this report is to provide a geo-environmental preliminary qualitative risk assessment and an assessment of potential geotechnical constraints in relation to the proposed development. The above objectives are to be met by undertaking the following:

- Reviewing desk-based information on site history, geology, hydrogeology and other potential environmental sensitivities;
- Identifying potential contamination sources, pathways and receptors at the site and surrounding area, and developing an initial Conceptual Site Model;
- Assessing and evaluating the potential for unacceptable risks to site receptors via qualitative environmental risk assessment in the context of the proposed site sensitivity;
- Identifying potential geotechnical constraints to the redevelopment of the site; and,
- Recommendations for further assessment to inform the design process for the proposed redevelopment.

1.3 Limitations

This report is for the private and confidential use of the Client for whom the report is undertaken and should not be reproduced in whole or in part, or relied upon by third parties for any use whatsoever. Fairhurst accepts no duty or responsibility (including negligence) to any party other than the stated Client(s) and disclaims all liability of any nature whatsoever to any such party in respect of this report.

1.4 Sources of Information

The following information sources were utilised in the preparation of this report:

- Archaeological Desk-Based Assessment, East Midlands Gateway Phase 2, Leicestershire, June 2022. Ref. JAC8062.V2
- British Geological Survey (BGS) online viewers (geology and hydrogeology) - GeoIndex (onshore) - British Geological Survey (bgs.ac.uk); last accessed on the 23rd May 2023;

- British Geological Survey (BGS), Geology of Britain (1:50,000 Sheet No. 141, Loughborough, Solid and Drift (published 2001). - www.bgs.ac.uk, last accessed on the 23rd May 2023;
- DEFRA Magic Map - https://magic.defra.gov.uk/MagicMap.aspx, last accessed on the 23rd May 2023;
- Designated Sites and Habitat Report, March 2023. Ref. 10666 – Diseworth Freeport, Diseworth, FPCR Environment and Design Ltd.
- Landmark Envirocheck Report, Ref. 295995909_1_1, dated May 2022 (included as Appendix B);
- North West Leicestershire District Council consultation response received 07th June 2022 (Appendix C);
- North West Leicestershire District Council Planning Portal (https://plans.nwleics.gov.uk/public-access/search.do?action=simple&searchType=Application) last accessed on the 23rd May 2023; and,
- UK Radon - http://www.ukradon.org, last accessed on the 23rd May 2023;

2.0 Site Details

2.1 Site Location

The site is located south of East Midlands Airport, to the north east of the village of Diseworth and to the north-west of Junction 23a of the M1 motorway. The site has an area of approximately 100ha and currently comprises undeveloped arable land with hedgerows and trees dividing the various fields. A public byway, known as Hyam's Lane, dissects the site from south-west to north-east. Overhead power cables are present extending across the western area of the site in a north to south direction and there is also a drain in the south-eastern area of the site.

Within this report reference is made to the northern area and southern area, although this is not formally defined within the proposed development plans, it has been utilised for ease of description. The northern area there is north of Hyam's Lane, and the southern area south of Hyam's Lane.

The site is bounded to the north by Ashby Road (A453) with East Midlands Airport beyond. Donington Park Services, including a petrol station, is located immediately adjacent to the north-east. To the east lies an undeveloped parcel of land, the A42 and the M1. To the south the site is bounded by Long Holden public byway with fields situated beyond and to the south-west is the village of Diseworth, situated from adjacent.

A topographical survey is presented within Appendix A.

2.2 Proposed Development

At the time of writing this report, the proposed development comprises the construction of c. 10 No. warehouses across 7 plots, varying in size between c. 2,787m^2 and 74,323m^2 with ancillary offices, associated loading docks and yards, parking, soft landscaping and access roads. In addition, the illustrative masterplan (Appendix A) includes a bus terminal, a bridge over Hyams Lane and landscaping bunds along the western boundary of the site.

In order to facilitate the development, bulk earthworks in the form of cut and fill, are anticipated across the site. A maximum cut of 9m and fill of up to 15m is proposed. It is understood that multiple development plateaus will be formed at varying elevations from c. 66.75m AOD in the south-east of the site, to 89.00m AOD in the north-east.

2.3 Site Walkover

A site walkover by a Fairhurst Engineer was undertaken on 01st July 2022.

The below information relating to the site condition and access to the site have been obtained through this walkover as well as a review of publically available information. Site photographs are included in Appendix E.

2.3.1 Site Access

The site can be accessed by both vehicles and pedestrians from several access points. The north-eastern most field can be accessed via a layby on the A453 whilst the fields north and south of Hyam's Lane can be accessed via several access points along its route. Furthermore, the southern fields can be accessed via 2 No. access points on Long Holden public byway, 1 No. in the south-west and 1 No. in the south-east of the site.

2.3.2 Boundaries and Surrounding Land Uses

The surrounding area is predominantly undeveloped agricultural land with the exception of a commercial / light industrial park with East Midlands Airport situated beyond, to the north of the site, Donington Park Services adjacent to the north-east of the site and residential properties with gardens and commercial businesses within Diseworth to the south-west.

2.3.3 Topography and Ground Surfacing

The topography of the site is undulating and generally falls towards the south. The site overall has a significant fall of approximately 36m from the north east (c. 90mAOD) to the south east (c. 54mAOD).

The ground cover north of Hyam's Lane comprises arable land which, at the time of Fairhurst's site visit, was used for wheat growing. Desiccated surface soils were observed across the north of the site.

Ground cover to the south of Hyam's Lane comprises arable land in which the northern most fields were used to grow wheat and the southern and south-easternmost fields were used for growing maize. A field in the south-west was also observed to not be utilised for the growing of crops with wild flowers and grasses growing. Desiccated soils were observed in the wheat fields, albeit not as frequently, whilst the maize fields were observed to be surfaced with dried clumps of soil which was not seen elsewhere on-site. Liason with the farmer indicated that green manure had been spread on the maize fields only. Field boundaries were observed to be formed with hedges and mature trees.

The presence of crops may pose as a constraint to undertaking intrusive ground investigation in specific areas of the site in certain months of the year.

2.3.4 Structures and Additional Features

No structures were noted during the walkover in the north east of the site, with exception of the telephone mast. As noted above, overhead cables traverse the western portion of the site. Reference to the Utility Connections Drawing ATS/UC22009, May 2022 indicates that these cables are 11k overhead high voltage cables.

2.3.5 Surface waters

A drainage ditch was observed extending from the south-eastern site boundary into the central-south-eastern area of the site. At the time of the walkover, the drain was observed to be dry in the southern end. Access could not be made / the drain was obscured by dense foliage along its northern extent.

An ecological survey conducted by FPCCR Environment and Design Ltd to inform their Designated Sites and Habitat Report (Ref. 10666) identified 3 No. ponds (P1-P3) on site.

Pond P1 is located in the centre of the site just north of Hyam's Lane. The pond is roughly 5 x 8m in size and is bounded by a small group of crack willow trees, lacking any aquatic vegetation.

Pond P2 is a field pond adjacent to the south side of a hedgerow between Hyam's Lane and the A453. It comprises a steep banked pond 20 x 5m in size bounded by a dense bramble scrub. The pond lacked aquatic vegetation.

Pond P3 is located adjacent to Donington Park Services and the telephone mast in the north-east of the site. It comprises a wet depression, with a small rectangular area of open water at its centre and is bounded by scattered scrub.

2.3.6 Contamination

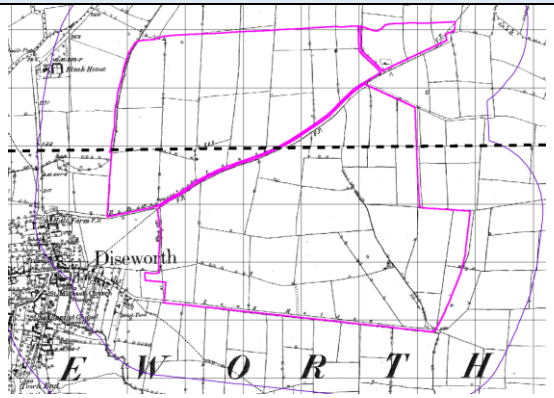
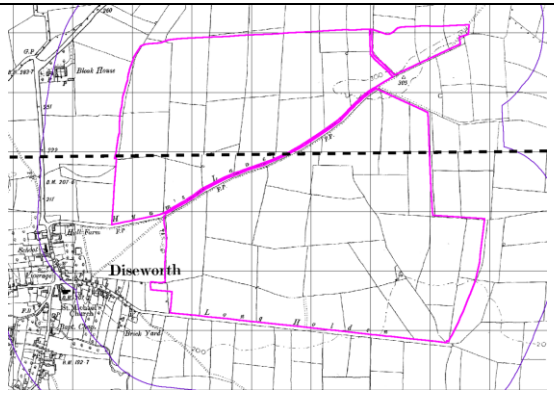
No significant potential sources of contamination were observed visually on site during the walkover, however following liaison with the farmer of the fields north of Hyam's Lane, 2 No. infilled clay pits are situated on the northern boundary. These were reportedly infilled c.10 years prior to the Fairhurst visit and were reportedly infilled with clay and brick rubble. Furthermore, the same farmer reported a redundant diesel powered generator was once situated on the southern boundary which was used to power a World War Two (WW2) decoy site in the south-eastern area of the site. The farmer stated that it was demolished some time ago (could not provide a precise date, but assumed active during the 1940s, and removed at a later date) and was not sure exactly where it was located.

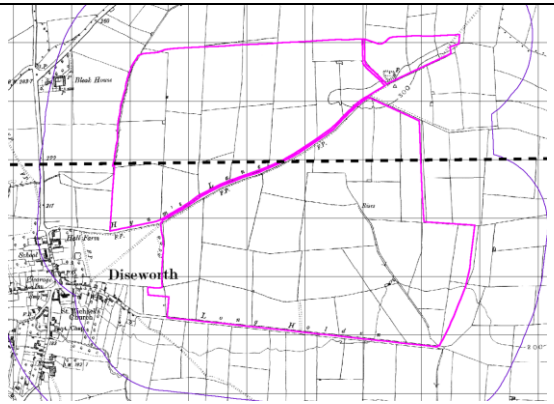
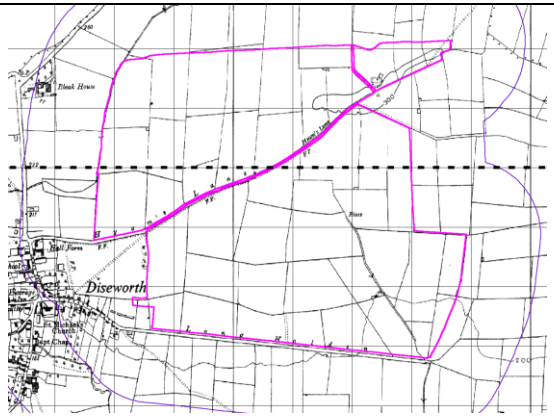
2.4 Historical Development of the Site

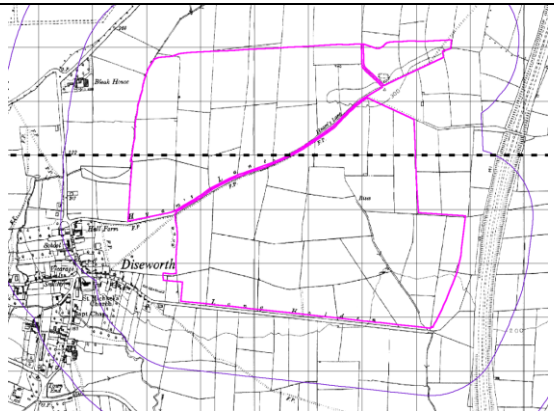
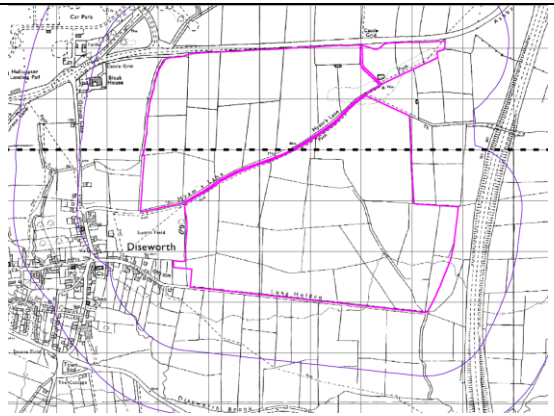
The historical development of the site and the surrounding area (predominantly up to 250m from the site boundary), based on Envirocheck historical mapping, has been summarised in **Table 1.** Copies of the historical maps are provided within **Appendix B** of this report.

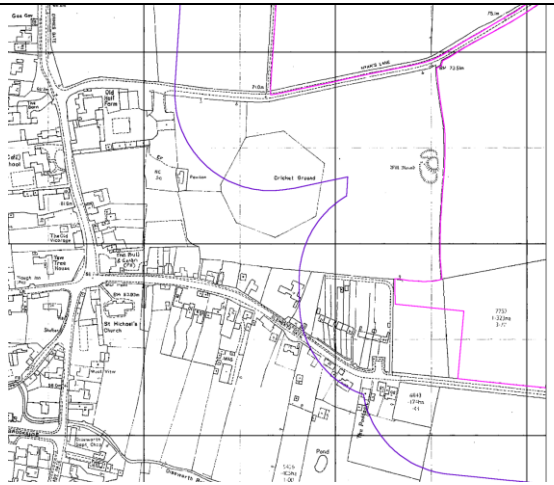
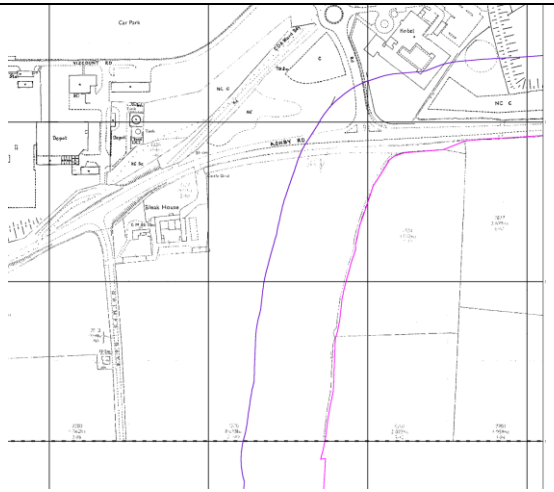
Potentially contaminative land uses highlighted with bold text and all distances are approximate.

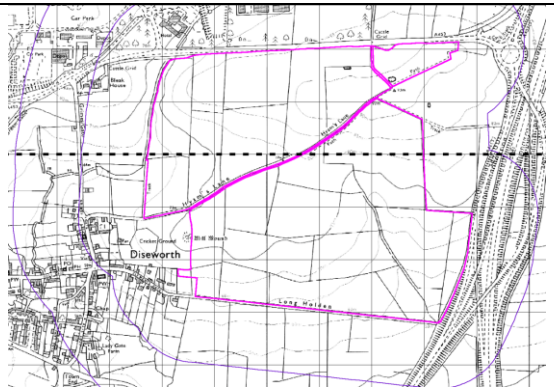
Table 1 - Summary of Historical On and Off-site Uses

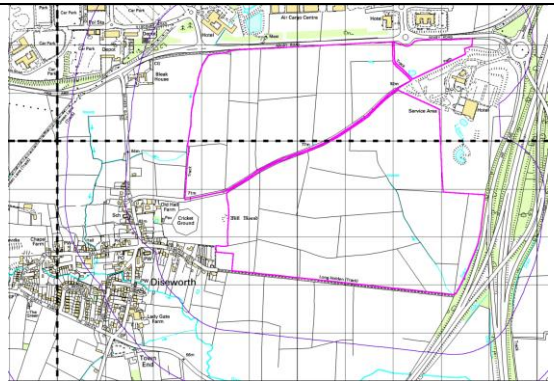
Year (Scale)	On-Site Features	Off-Site Features	Map Extract (the Site Boundary is Denoted by a Pink Line)
1883 (1:10,560) 1884 (1:2,500)	The site comprises **agricultural fields** with a stream extending approximately north-west to south-east in the south-eastern area of the site. An arrow on the 1:10,560 indicates a southerly flow. Small ponds are also labelled in the north-east and in south-east of the site with the latter situated next to the aforementioned stream. A footpath is labelled extending onto the north-eastern corner of the site, orientated from north-east to south-west. Furthermore a drainage ditch is indicated to extend onto site from west, situated along the southern side of Hyam's Lane.	The surrounding land use us indicated to be predominantly **agricultural fields**. A **brick yard** is labelled 100m south-west of the site and small ponds are located from adjacent west, 80m and 100m east and 200m west. Diseworth Brook is noted c. 100m south west of the site at its closest point, flowing in a south and westerly direction.	 1883 1:10,560 map extract
1901 (1:10,560) 1903-1904 (1:10,560) 1903 (1:2,500)	No significant changes.	Further ponds are labelled from adjacent west and 230m north of the site.	 1903-1904 1:10,560 map extract

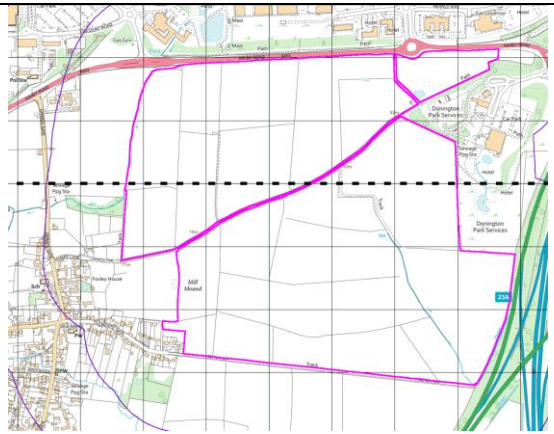
1921 (1:2,500) 1922 (1:10,560)	A possible **pump** is labelled at the pond in the north-east of the site and further small potential ponds are situated on the northern side of Hyam's Lane, in the centre of the site and in the north of the site. The latter pond has a drainage ditch indicated to extend southwards from it towards Hyam's Lane.	The brickyard 100m south-west of the site is no longer shown and a stream is labelled extending along the western site boundary, orientated approximately north to south. An arrow on the 1:10,560 mapping indicates a southerly flow.	 1922 1:10,560 map extract.
1955 (1:10,560) 1962 (1:2,500)	The small pond adjacent to the south east corner of the site is no longer labelled and assumed **infilled**.	An **airfield** is labelled from 400m north of the site in 1955 mapping. The airfield then extends to within 50m north-west of the site in the 1962 mapping.	 1955 1:10,560 map extract.

1966-1967 (1:10,560) 1967-1969 (1:2,500)	A pond is situated in the north-eastern corner of the site.	The M1 motorway was constructed from 100m east of the site which included construction of **embankments**. The airfield north of the site was labelled as East Midlands Airport.	 1966-1967 1:10,560 map extract.
1972-1975 (1:10,000) 1971-1974 (1:2.500)	No significant changes	**Tanks** are labelled from 260m north-west of the site. Two small ponds are indicated within the sports field immediately west of the south western portion of the site.	 1972-1975 1:10,000 map extract.

1980-1984 (1:2,500)	No significant changes.	A depot is labelled in the area of the tanks and is located from 250m north-west of the site. Furthermore, a possible archaeological feature known as 'Mill Mound' is situated adjacent to the south western boundary where 2 no. ponds were previously noted, and potentially subsequently **infilled**.	 1980-1984 1:2.500 map extract showing the south-western area of the site.
1989 (1:10,000) 1987 (1:2,500)	No significant changes.	Commercial / light industrial type buildings and a hotel are situated from 100m north of the site.	

			1987 1:2,500 map extract showing the north-eastern corner of the site.
1992-1994 (1:10,000) 1992-1993 (1:2,500)	No significant changes.	A **works** is labelled 190m south-west of the site. Furthermore, a junction linking the M1 to the A453 (adjacent to the northern site boundary) was constructed from adjacent north-east of the site.	 1992-1994 1:10,000 map extract.

2000 (aerial photograph)	No significant changes.	**Donnington Park Service Station** are situated adjacent north-east of the site and two ponds to the south of it. Commercial / light industrial buildings are present from 50m north of the site. There is evidence of potential earthworks associated with construction of the roundabout 50-100m NE of the site.	 2000 aerial photographs (NE of site)
2006 (1:10,000)	No significant changes.	No significant changes. Two man made ponds are indicated to be present adjacent to the airport.	 2006 1:10,000 map extract.

2021 (1:10.000)	No significant changes.	A **sewage pumping station** is situated 240m west of the site, next to the stream that extends along the western site boundary before changing direction westwards. Another **sewage pumping station** is present within the Donnington Park Services, 50m north-east of the site.	 2021 1:10,000 map extract.

3.0 Geology and Hydrogeology

The British Geological Survey (BGS) 1:50,000, Sheet No. 141, Loughborough, Solid and Drift (dated 2001) and nearby historical BGS borehole records have been reviewed to provide information on the published underlying geology and ground conditions at the site.

3.1 Made Ground

Due to the absence of significant historical development on site, Made Ground deposits across the site are not anticipated to be present site wide, or of a high thickness. However, as identified in the walkover section, 2 No. infilled clay pits are potentially present on the northern boundary which were reportedly infilled c.10 years prior to the Fairhurst visit and were reportedly infilled with clay and brick rubble. The location of these pits are not recorded on aerial satellite imagery or the historical maps however, the geophysical survey included within the RPS Group Archaeological Desk-Based Assessment and conducted by Magnitiude Surveys Ltd indicates the presence of potential debris within the shallow soils in 2 No. locations along the north boundary of the site.

3.2 Superficial Geology

The BGS mapping that three types of superficial deposits cover the site:

- Head deposits comprising clay, silt sand and gravel are identified surrounding the watercourse in the north-western corner of the northern field. According to BGS Lexicon, Head Deposits are a poorly sorted and poorly stratified unit which was deposited by solifluction processes;
- Glaciofluvial deposits comprising sand and gravel are identified across most of the central region in the northern portion of the site and in the north-east corner of the southern half of the site. Glaciofluvial Deposits are a general a term for sand and gravel deposited in supraglacial, englacial, subglacial and ice-marginal drainage systems. The deposit may also include beds of diamicton, silt and clay.
- Oadby Member (Diamicton Till) is identified in the north-east corner of the southern portion of the site and southern centre portion of the northern half of the site. This unit generally consists of a heterogeneous mixture of clay, sand, gravel and boulders deposited directly beneath a glacier.

3.3 Bedrock Geology

The site is underlain by sedimentary rocks belonging to the Mercia Mudstone Group, principally comprising of the Gunthorpe Member, described as 'Mudstone, red-brown, with subordinate dolomitic siltstone and fine-grained sandstone, greenish grey, common gypsum veins and nodules'. The Gunthorpe Member is typically up to 70m – 90m thick. On site, subcrops of dolomitic siltstone and the Diseworth Sandstone are recorded, the latter of which is described by the BGS as pale greenish siltstone and fine grained sandstone, typically 2-4m thick.

A number of faults are recorded on site, including two faults approximately traversing west to east near the northern boundary of the site, and c. 250m south of the site, with stratum downthrown to the south and north respectively. Approximately four faults are then indicated in a north/south and north west/south east direction, with down throw direction of west and east.

Previous Ground Investigations

The BGS online database contains records of numerous intrusive investigations in and around the site of which the ground conditions encountered by some of these investigations is summarised

below. Note, the described geology is taken directly from the logs and refer to the logging standards at the time of investigation.

Northern Site Area

Historical boreholes are not present within the site boundary, though numerous boreholes in proximity to the site are noted. Borehole SK42NE157 (~200m west of the western boundary) identified topsoil to 0.20m bgl which was underlain by soft to firm silty/very silty sandy clay to 4.80m bgl. Note, shear surfaces were noted between 2.80m bgl and 3.70m bgl which may represent faulting. Between 4.80m bgl and 8.40m bgl, very stiff silty sandy clay with rock fragments, gravel and cobbles is noted. This was underlain by competent rockhead which consisted an interbedded sequence of mudstone and siltstone to 13.0m bgl (borehole termination).

Borehole SK42NE707 (~130m east of the north-eastern corner of the site) identified similar ground condition to SK42NE157, though rockhead was noted at 2.95m bgl (81.90m AOD) which comprised of stiff clay to very weak to weak mudstone and thinly interbedded weak/moderately strong siltstone to 17.20m bgl (borehole termination).

Shallow boreholes (SK43NE158, SK42NE81, SK42NE711, SK42NE80) identified topsoil (gravelly clayey topsoil with frequent rootlets) to 0.20m bgl, which was underlain by soft to very stiff silty/silty sandy clay (with lithorelics) to 2.80m bgl (79.65m AOD) – 5.00m bgl (79.29m AOD). SK2NE711 identified rockhead (moderately strong siltstone at 2.80m bgl (79.65m AOD).

Southern Site

Borehole SK42SE248 was openhole (no recovery) to 3.0m bgl, but identified stiff to very stiff slightly gravelly clay to 6.50m (core loss was noted between 3.90m bgl and 3.50m bgl). This was underlain by generally moderately weak (though variable from weak to moderately strong) mudstone and siltstone to 15.0m bgl (47.30m AOD). A water strike was noted at 8.00m bgl (54.20m AOD).

Borehole SK42SE155 identified topsoil to 0.10m bgl which was underlain by stiff silty clay with mudstone lithorelicts to 5.50m bgl. This was underlain by rockhead (weak to very weak mudstone) at 5.50m bgl (49.34m AOD).

East Midlands Gateway Phase 1

A ground investigation has previously been undertaken approximately 1km of the site at the Segro East Midlands Gateway Logistics Park. A 'Preliminary Ground Investigation Interpretative Report for the Zone 1 Main Development Plateau and Rail Freight Terminal' by RSK (Report Reference 312494/1-03 (00), December 2013). A review of the published geology for the Logistics Park to the north indicates that similar ground conditions are anticipated on both sites with some glacial till and Head Deposits anticipated locally and bedrock of the Mercia Mudstone Group.

The geo-environmental risks were predominantly assessed as negligible following the ground investigation, albeit Ground Gas Characteristic Situation 2 was recommended for the site based on elevated flow and carbon dioxide readings, the source of which was not discussed within the report.

The report concluded the shallow pad foundations and floor slabs would likely be suitable, subject to loading and settlement tolerances and appropriate earthworks specification. Where differential settlement was a potential concern due to cut/fill or existing variable ground conditions, ground improvement and/or piling was noted as a potential solution.

3.4 Mining and Land Instability

Information provided within the Envirocheck Report (Appendix B) indicates the following in relation to land instability at the site:

- Very low hazard for collapsible ground stability hazards;
- Generally no Hazard for shrinking and swelling clay ground stability hazards, though low hazards identified north, east and north-east of the site;
- No hazard for compressible ground stability hazards;
- Very low to no hazard for running sands ground stability hazards;
- No hazard for ground dissolution stability hazards;
- Very low to low hazard for landslide ground stability hazards; and,
- The site is not located in an area of coal-mining activity.

3.5 Hydrogeology

Information provided from the Environment Agency indicates that the bedrock deposits are classified as a Secondary B Aquifer and the superficial deposits are classified as a Secondary Undifferentiated Aquifer (Oadby Member and Head deposits) and Secondary A Aquifer (Glaciofluvial deposit).

Information provided from the Environment Agency indicates the groundwater vulnerability of the Bedrock Secondary A Aquifer is classified as High. The site is not located in a Source Protection Zone (SPZ). The site it is located within a Nitrate Vulnerable Zone.

The Envirocheck Report indicates that there are no groundwater abstraction points within 1000m of the site boundary.

3.6 Hydrology and Flooding

A drainage ditch was observed extending from the central-south-eastern area of the site to the south east corner of the site. At the time of the walkover the drain was observed to be dry in the southern end whilst access could not be made / the drain was obscured by dense foliage in the further north along its extent.

A basin was observed in the south-west of the north-easternmost field, adjacent to the telephone mast, however it appeared to be dry at the time of the site walkover.

A review of the Site Sensitivity Maps within the Envirocheck Report (Appendix B – extract provided in Plate A below) indicates the presence of the following watercourses/features:

- Small pond within the northern field – not evident on site during the walkover;
- Man-made ponds/drainage features 65m – 80m east of the site understood to be associated with the adjacent motorway services;
- A pond c. 50m west of the site – visible on satellite imagery at the end of Cheslyn Court and on historical maps from c. 2000;
- Two man made pond/drainage features c. 70m to the north adjacent to the Airport
- A pond c. 180m south west of the site.

- Inland Rivers are recorded within the Envirocheck Report as follows
    - Along the western boundary of the site, flowing in a southerly direction before flowing to the west, to eventually meet Diseworth Brook;
    - Diseworth Brook which flows in an easterly direction approximately 248m south-west of the site at its closest point;
    - A stream which issues in the south eastern portion of the site, flowing to the south eastern corner, where another tributary converges from the eastern boundary of the site, flowing south to meet Diseworth Brook; and,
    - Long Whatton Brook which flows south-west to north-east and is c. 545m south-east of site at its closest point.

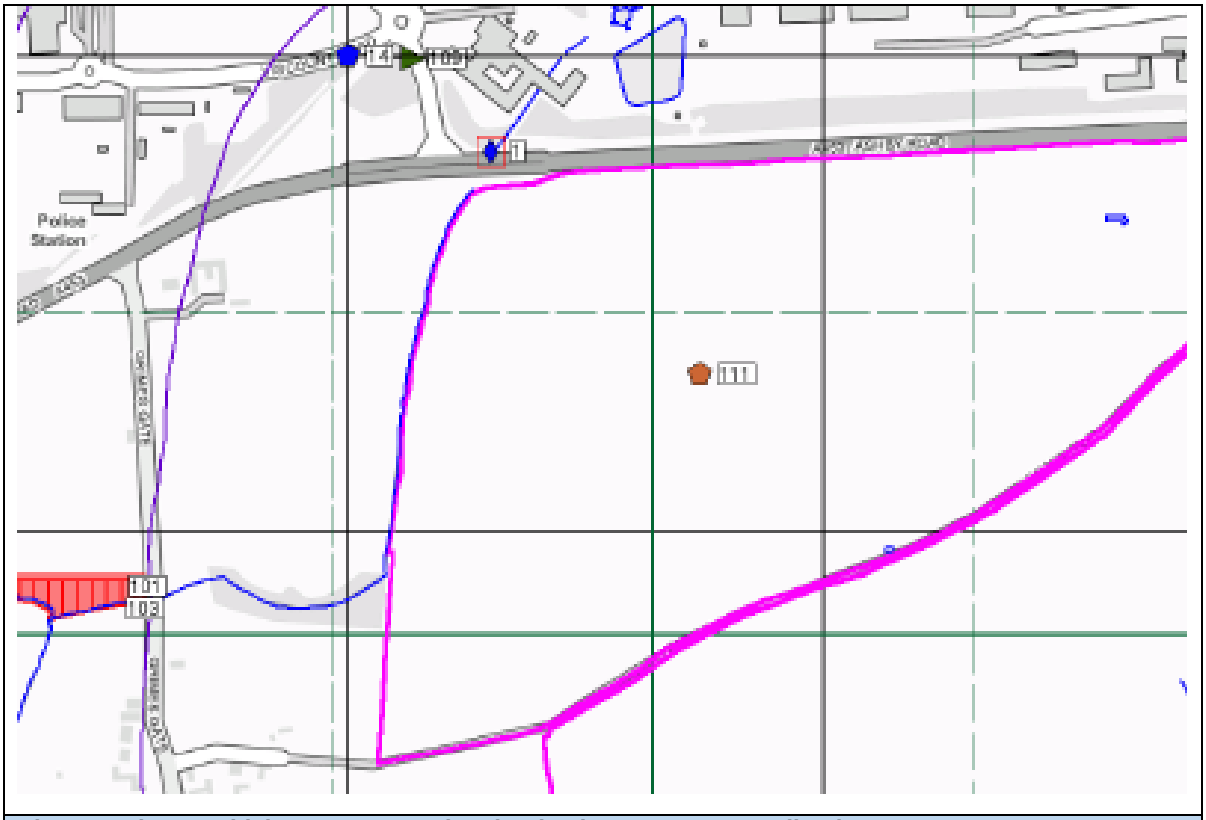


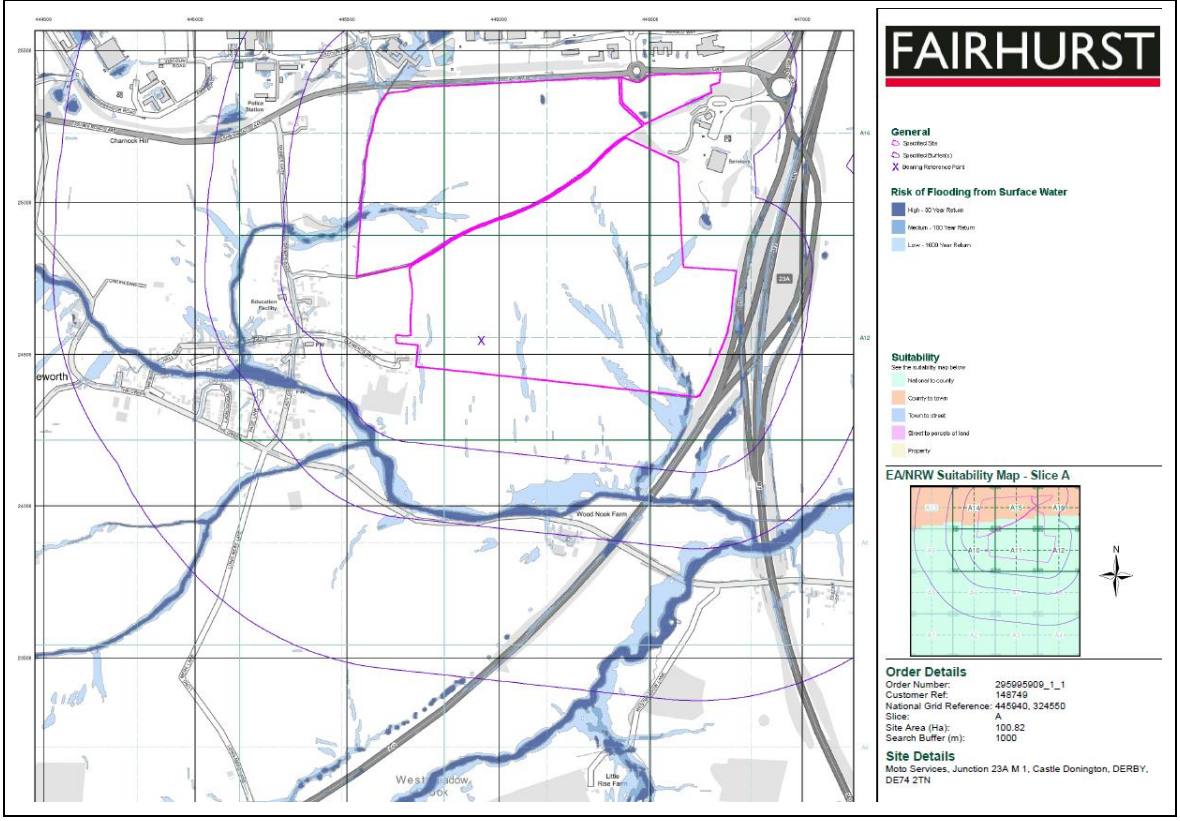
Plate 1 – Site Sensitivity Map Extract (Envirocheck Report – Appendix B)

Based on the information available it is considered that groundwater flow direction is likely to be in the south to south easterly flow direction. As such, surface water receptors are largely associated with the ponds identified on site, the drainage ditch in the south east and the associated tributaries of the Diseworth Brook. Ponds to the north and south west are not considered likely receptors.

Information provided from the Environment Agency (EA) Flood Map for Planning indicates that the site is located in Flood Zone 1 (not considered to be at risk of flooding from rivers or seas up to the 1 in 1,000 year annual exceedance probability event (0.1% AEP)).

An extract of the 'Risk of Flooding from Surface Water' is presented below within Plate 2.

Plate 2 – Extent of Flooding Risk from Environment Agency



Although preliminary comment has been made in relation to flood risk base on the mapping this report does not provide formal advice on flood risk.

3.7 Mineral Safeguarding

The site is within the Mineral safeguarding Zone for the Leicestershire County Council area whereby the Leicestershire Minerals and Waste Local Plan (September 2019) has been adopted. This has been addressed under a separate cover in the Fairhurst Mineral Safeguarding Report (Ref. 148749/R5).

4.0 Environmental Information

4.1 Radon

Mapping of the radon risk associated site viewed on the UK Radon website identified that the site is within an area where less than 1% of homes are affected by radon. As such it is considered that radon protection measures are not required for new structures. The information presented within the Envirocheck report confirms that the site is considered to be at very low risk of the potential negative implications of Radon, and that protection measures are not required.

It is acknowledged that the Radon Risk Maps were updated in December 2022 (Envirocheck Report dated May 2022), however a review of the freely available risk maps (https://www.ukradon.org/information/ukmaps), confirms the site is in an area where less than 1% of properties are above the action level, and as such radon protection measures are not required.

4.2 Ground Gas and Vapours

Due to the current condition of the site, and lack of historical development on site, extensive Made Ground soils are not anticipated across the site, nor have any sources of natural ground gas been identified based on the published geology. There is the potential for localised Made Ground deposits associated with the infilled pits noted by the farmer and to a lesser extent, historical pond features potentially infilled offsite identified within Section 2.4. Table 2 below summarises the potentially infilled land identified within the Envirocheck database report.

The Envirocheck report also records 1 waste transfer site on site (dated 1986, operated by East Midlands Airport Authority). This had had an input rate of less than 10,000 tonnes per year and the source of waste being the waste produced on site (waste included commercial waste and commercial waste of a domestic nature). Based on the site walkover and review of historical maps, there is no evidence of the associated infrastructure of a waste transfer station having been on site. It suspected that this location record may be an error and is more likely associated with the handling of airport waste, on the East Midlands Airport site to the north.

Should the waste transfer station entry be correct, there have been deposition of waste in this area which may present an additional ground gas hazard.

The Envirocheck report records 1 historical landfill within 500m of the site (254m NW of site). The licence holder is not known though the landfill operated from 1960 to 1970. Waste included inert, industrial, commercial and household waste.

The Envirocheck report records 1 landfill site within 500m of the site (256m NW). The type of waste and date of closure of the landfill site is not provided in the Envirocheck report.

Along with the identified infilled land during the site walkover and through the review of historical mapping, the Envirocheck report holds a number of records of potentially infilled land within 500m of the site. The records are listed in Table 2 below. The potential risk associated with these sources is considered further in the preliminary conceptual site model and qualitative risk assessment.

Table 2 Potentially Infilled Land within 500m of Site

Type	Use	Location Relative to Site	Date of Mapping
Anecdotal report of 2 clay pits.	Understood to have been backfilled with Clay and Brick Rubble.	Located in the north of the site, adjacent to the A453	Anecdotally 2010
Potentially Infilled Land (Non-Water)	Unknown Filled Ground (Pit, Quarry, etc.)	29m SW	1993
Potentially Infilled Land (Water)	Unknown Filled Ground (pond, marsh, river, stream, dock etc.)	169m NW	1922
Potentially Infilled Land (Water)	Unknown Filled Ground (pond, marsh, river, stream, dock etc.)	200m S	1955
Potentially Infilled Land (Water)	Unknown Filled Ground (pond, marsh, river, stream, dock etc.)	214m S	1955
Potentially Infilled Land (Water)	Unknown Filled Ground (pond, marsh, river, stream, dock etc.)	296m S	1955

4.3 North West Leicestershire District Council Consultation

The Contaminated Land Officer at North West Leicestershire was contacted in preparation of this report on the 25th May 2022 and a response was issued on 7th June 2022 (see **Appendix C).**

This response provided reference to 2 No. landfills within 500m of the site. These landfills are:

- Off Grimes Gate, Diseworth landfill (waste including inert, industrial, commercial and household). No information was provided to suggest if this is an active or historical landfill, though this landfill is not observed on satellite imagery (GR 445200, 324900); and
- Long Mere Lane, Diseworth landfill (waste including inert, commercial and household). o information was provided to suggest if this is an active or historical landfill, though this landfill is not observed on satellite imagery (GR 445000, 324100). The response from the contaminated land officer also confirmed the absence of gas on surface.
- The Local Authority confirmed the site is not classified as part 2A.

Please see Appendix C for the complete response.

4.4 Asbestos

It is expected that areas of the site will have no Made Ground, where asbestos in soil is unlikely to be encountered. Known pits have been backfilled and further unknown pits are possible, which have a higher likelihood of asbestos in soil being present. Less commonly, bulk asbestos has been known to have been buried or used on farmland.

4.5 Unexploded Ordnance (UXO)

A UXO Desk Study & Risk Assessment (document reference P11996-22-R1, Rev A, dated 25th July 2022) was produced by Zetica UXO. The report confirmed the following:

- Records indicate that 3No. High Explosives bombs fell on the site during World War Two (WWII) and explode;
- The site had 2 bombing decoys on the site;
- No other significant sources of UXO hazards have been identified on site;
- The site has a low UXO hazard level; and
- No additional measures are considered essential to reduce UXO risk on site and any proposed works (excavations, boreholes/piling) can proceed.

4.6 Invasive Species

An assessment for invasive species is outside the scope of this report.

4.7 Consented, Permitted and Other Activities

Table 3 summarises relevant information provided within the Envirocheck Report, including details of potential off-site contaminative land uses. Potential sources located at a distance greater than 250m from the site are generally discounted on the basis of distance and influence from the subject site. Migration of ground gas for instance from landfills are generally considered within a greater distance of 500m from the site.

Table 3 Summary Potential Contaminative Consents, Permits and Other Activities

Details	Location Relative to Site	Status
Waste Transfer Site (suspicion of incorrect entry)	On Site	-
Local Authority Pollution Prevention and Controls, BP Petrol Station Moto Donington Park Service Station, M1 Northbound, Petrol Filling Station	67m NE	Authorised
Pollution Incidents to Controlled Waters- Oils – Diesel, including Agricultural, no adverse effects- oil spill from ruptured diesel tank on lorry (Category 3 minor incident)	26m E	-
Substantiated Pollution Incident Register, November 2002, Category 2 (significant impact on water), no impact (category 4) on air or land	195m NW	-
Historic Landfill Site	250m W	-

The Envirocheck report lists current potentially contaminative land uses within 500m of the site, of which those present within influencing distance of the site (250m or 500m for ground gas risk) have been considered in this report; these are presented in Table 4.

Table 4 – Summary of Contaminative Industrial Land Uses

Land Use Activity	Distance (m)	Direction
Waste transfer station (if record is accurate)	On site	-
Service Area (active)	67	NE
Vehicle Cleaning Service (no status given)	67	NE
Petrol Filling Station (inactive)	67	NE
Printed Circuit Services (active)	89	NE
Petrol Filling Station (active)	90	NE
Vehicle Cleaning Service (no status given)	113	NE
Petrol Filling Station (inactive)	127	NE
Petrol Filling Station (inactive)	127	NE
Distribution and Haulage (no status given)	159	N
Freight Forwarders (active)	160	N
Freight Services (inactive)	160	N
Freight Forwarders (inactive)	160	N
Distribution and Haulage (no status given)	160	N
Distribution and Haulage (no status given)	160	N
Distribution and Haulage (no status given)	160	N

5.0 Conceptual Site Model and Qualitative Risk Assessment

An initial conceptual site model (CSM) represents the characteristics of the site that show the possible relationship between identified potential contaminant sources, pathways and receptors. The Principles of Environmental Risk Assessment are presented in Appendix F. The significance of the presence of sources, pathways and receptors is considered by carrying out a risk assessment of all potentially complete source-pathway-receptor (S-P-R) linkages.

5.1 Source Characterisation

Potential sources of contamination at the site have been established based on the site walkover, the historical map review, review of environmental information within the Envirocheck Report and taking account of local ground investigation information. Potential sources located more than 250m from the site are discounted on the basis of distance and influence from the subject site. The exceptions are potential sources of ground gas and / or soil vapour, such as landfill, which are considered relevant up to 500m from the site boundary. The remaining relevant potential sources are shown in Table 5.

Table 5 - Identified Potential Sources of Contamination

Potential Contamination Sources	
On-site	
Infilled Clay Pits (north of site) – Anecdotally identified based on farmers description	
Redundant diesel powered generator (now demolished) – Based on Farmers Description (suspected date, mid 1940s)	
Waste Transfer Site	
Off-site	**Location**
Service Area (current)	67m NE
Vehicle Cleaning Service	67m NE, 113m NE
Petrol Filling Station (current and historical)	67m NE, 90m NE, 127m NE
Printed Circuit Services (current)	89m NE
Distribution and Haulage	159m N, 160m N
Freight Forwarders/Services	160m N
Historical Landfill Sites	254m NW
Landfill Sites	256m NW
Potentially Infilled land (historical)	29m SW, 169m NW, 200m S, 214m S, 296m S

Table 5 contains the most pertinent identified potential sources of contamination based on the available data at the time of reporting.

The ‘Contaminants of Concern’ for those potential sources which cannot be discounted, as identified in Table 5, are listed in Table 6.

Table 6 - Contaminants of Concern for Sources Identified

Land Use	Location	Potential Contaminants
Infilled clay pits	(2no. in the North)	Asbestos, Heavy Metals, TPHs, PAHs, VOCs, SVOCs and ground gases/vapours
Former diesel generator	South of the site	Asbestos, Heavy Metals, TPHs, PAHs, VOCs, SVOCs and ground gases/vapours
Waste Transfer station	Centre of Northern area (suspected incorrectly located)	Asbestos, Heavy Metals, TPHs, PAHs, VOCs, SVOCs and ground gases/vapours, ammonia.
Service Station, including petrol filling station, car wash.	67 – 90m North East	Asbestos, Heavy Metals, TPHs, PAHs, VOCs, SVOCs and ground gases/vapours
Various Works associated with the airport	80 – 160m North.	Asbestos, Heavy Metals, TPHs, PAHs, VOCs, SVOCs and ground gases/vapours
Historical/Current Landfill site	254m North West	Asbestos, Heavy Metals, TPHs, PAHs, VOCs, SVOCs and ground gases/vapours, ammonia,

5.2 Receptor Characterisation

Potential receptors at the site are related to the development proposals and the surrounding area. The location of the site relative to sensitive environmental receptors have been considered, as well as the ground and groundwater conditions at and below the site.

A review of the proposed development, as outlined within section 2.2 of this report, and present within Appendix A, indicates that the site is to be utilised as a commercial space and shall contain commercial occupation. Part of the site is to be lain with hardstanding which will break direct exposure pollutant linkages (not including vapours or gas) however there are areas of soft landscaping and multiple large warehouse units. Therefore, it is considered that given the development proposal, the human health of on-site commercial end users and off-site third party land users is a potential risk and will be considered in table 5 highlighting pathways of pollutants.

With the above considered, this report has identified the following potential receptors:

- Human Health: On-site staff, visitors and occasional maintenance workers; off-site; off-site commercial end-users;
- Structures: On- and off-site building fabric and services; and
- Controlled Waters: Groundwater of resource potential associated within bedrock deposits (Secondary B Aquifer) and superficial deposits (Secondary A and Secondary Undifferentiated Aquifer) beneath the site and surrounding area. The inland streams identified on and within the vicinity of the site are also potential receptors.

No statutory or non statutory designations in relation to potentially sensitive ecological receptors have been identified in relation to the redevelopment of this site. Although it is noted the site is located in a nitrate vulnerable zone. Various Non Statutory Designations are present within 1km of the site. Considering this, the site is considered to have a low sensitivity in relation to ecological receptors.

Construction workers of the proposed redevelopment are identified as potential receptors. However, it is considered that associated risks can be managed using appropriately drafted and implemented Risk Assessment Method Statements (RAMS) during the construction phase. RAMS should also include appropriate pollution prevention and control measures. The results of any ground investigation should be made available to the Principle Contractor to inform the RAMS. Construction workers will not be considered further in the qualitative risk assessment.

5.3 Pathway Characterisation

The following potential pathways relevant to the identified receptors are presented below:

<u>On-site Human Health</u>

- Dermal (skin) contact, ingestion and or/inhalation with contaminated soils, during construction and following completion;
- Inhalation of ground gas/soil vapours; and
- Ingress of contaminants into water supply pipes contaminating drinking water supplies, followed by ingestion.

<u>Off-site Human health</u>

- Ingestion and / or inhalation of windblown contaminated soils from the site, during construction and following completion;

- Inhalation of ground gas / soil vapours derived from the site where it has accumulated in buildings; and
- Ingress of contaminants into off-site water supply pipes contaminating drinking water supplies, followed by ingestion.

On-site Buildings and Services

- Ground gas and / or soil vapour migration and accumulation in voids within or beneath the proposed structures;
- Direct contact of building fabric with contaminated and/or aggressive soils or groundwater.

Off-site Buildings and Services

- Ground gas and / or soil vapour migration derived from the site and accumulation in voids within or beneath the proposed structures, followed by explosion; and,
- Off-site migration followed by direct contact of building fabric with contaminated and/or aggressive soils or groundwater.

Controlled Waters

- Leaching of contaminants from the soil to groundwater and surface water on and off-site.

5.4 Pollutant Linkages

The preliminary CSM outlined below has been used to undertake an initial assessment for the site to determine the possibility of significant risks in the context of Part IIA and environmental liability. All potential sources, pathways and receptors detailed above have been considered. The principles of environmental risk assessment are presented as Appendix F.

Table 5 – Preliminary Quantitative Risk Assessment for Identified Potential Sources of Contamination

Source	Potential Pathways	Potential Receptors	Assessment	Severity	Probability	Risk Class
Potential on-site sources (see Table 5 and Table 6)	Dermal contact / ingestion and / or inhalation of contaminated soils	On-site human health (see Section 5)	Given the commercial nature of the development, the potential harm to human health relating to the potential pathway is reduced. However given that soft landscaping is included within the developed proposal, the pathway is still present.	Medium	Low Likelihood	Moderate /Low
	Inhalation of accumulated ground gases and/or soil vapours		Made Ground is anticipated across the site therefore gas risks exist on site due to the presence of infilled land/ponds and the historical use as a waste transfer.	Medium	Low Likelihood	Moderate /Low
	Permeation of water supply pipework		Contaminants with the potential to deteriorate water supply pipes and migrate into the on-site water supply may be present within the underlying soils. Due to the lack of historical investigation on site, geo-environmental lab testing of the underlying soils is recommended to confirm the above.	Medium	Low Likelihood	Moderate /Low
	Inhalation of wind-blown contaminated soils	Off-site human health (see Section 5)	Given the commercial nature of the development, the potential harm to human health relating to the potential pathway is reduced. However given that soft landscaping is included within the developed proposal, the pathway is still present. Risk during construction should be managed with dust suppression methods.	Medium	Unlikely	Low
	Off-site migration, followed by inhalation of accumulated ground gases and/or soil vapours		There are potential on-site sources of ground gas which could migrate off site in the unsaturated zone. However, the potential for ground gas migration may be reduced as a result of the anticipated cohesive ground conditions.	Medium	Unlikely	Low
	Permeation of water supply pipework		Groundwater is anticipated to be present at ~5-8m bgl and presents a pathway for on-site contamination to migrate off-site and come into contact with drinking water supply pipes.	Medium	Low Likelihood	Moderate/Low

Source	Potential Pathways	Potential Receptors	Assessment	Severity	Probability	Risk Class
	Dermal contact / ingestion and / or inhalation of contaminated soils	Construction workers	Construction workers, in particular ground workers have the potential to be in direct contact with soils.	Mild	Likely	Moderate/Low
	Inhalation of accumulated ground gases and/or soil vapours	Construction workers	Construction workers have the potential to be impacted by hazardous ground gasses in confined spaced.	Mild	Low Likelihood	Low
	Direct contact of building fabric with contaminated soils and/or groundwater	On-site building materials and services	There is potential for Made Ground/groundwater to contain contaminants and sulphates which may degrade building structures. The specification of the concrete materials which shall be utilised for the development are unknown.	Medium	Low Likelihood	Moderate/Low
	Ground gas and / or soil vapour accumulation within voids or beneath structures		There are potential sources of ground gas on site, as identified above, though further investigation is required to assess the gas risk.	Medium	Low Likelihood	Moderate/Low
	Vertical leaching and migration of contaminants from soil to groundwater and lateral leaching and migration into the adjacent source water systems	Superficial (Secondary A Aquifer and Secondary Undifferentiated) and bedrock (Secondary B) aquifers and surface water	Due to the potential presence of a shallow groundwater at roughly 5-8m bgl, a risk of contamination migration exists. However, due to a lack of groundwater data, further investigation is recommended to better understand hydrogeological conditions beneath the site.	Medium	Low Likelihood	Moderate/Low
	Migration of contaminants onto site followed by direct contact with building fabric	Property (on-site)	There is potential for foundations to come into direct contact with superficial/Bedrock groundwater at the site and potential associated contamination from off-site sources.	Mild	Low Likelihood	Low
	On-site migration onto site, followed by accumulation of ground gas / soil vapours and ignition		Made Ground and potentially Fill from surrounding development and historical infilled land, landfills, presents a source of ground gas to the site.	Medium	Low Likelihood	Moderate/Low

Risk Ratings:

- High - The available information indicates a significant possibility of harm to a receptor requiring further investigation, assessment or treatment.
- Moderate - The available information indicates a potential for significant harm to a receptor requiring further investigation and assessment.
- Low - The available information does not indicate a significant potential for harm to a receptor requiring further investigation. This does not indicate zero risk.

The preliminary risk assessment undertaken using information provided to date suggests that risks range generally from low through to moderate / low.

6.0 Geotechnical Considerations

The following potential geotechnical constraints to development may be present at the site inferred from desk based findings identified to date:

- The desk study has identified infilled ground in small areas on the site and its composition or compaction regime is not known. This gives rise to potential settlement (total and differential) risks and locally low strength soils.
- The BGS mapping indicates the presence of numerous geological faults, as described in this report. These introduces numerous geotechnical issues including introduction of pathways for water flow (including contaminated waters), fractured/poor quality rockmass leading to instabilities and potential for sudden changes in rockhead depth (due to upthrow and downthrow of fault);
- Made Ground and Superficial deposits may contain obstructions typically in the form of brick, building rubble, cobbles and boulders;
- Pyrite (sulphate 'attack') may represent a risk to the proposed building structures and foundations associated with Made Ground, groundwater and natural soils.
- Potential for a groundwater body within the near-surface superficial/bedrock which may require pumping/dewatering during an intrusive works;
- The cohesive dominant superficial deposits may represent a potential risk to the proposed development with regards to shrink swell (heave).
- There is potential for surface water flooding during heavy rainfall in the western (northern site) and south-eastern part of the southern site which may impact on site works;
- Due to the lack of site investigations on site, and the identification of 3 different type of superficial deposit from BGS mapping, there is the potential for variable strength superficial deposits underlying the site; and
- Numerous ponds have been identified on site. There is the potential for silt rich soils to be present underlying these, which may require excavation and backfilling with geotechnical suitable material in accordance with a site specific earthworks specification.

7.0 Conclusions & Recommendations

The Desk Study indicates that based on the initial CSM and Preliminary Risk Assessment (PRA), the majority of complete pollutant linkage pathways are of **Moderate/Low or Low** risk. The PRA Preliminary Risk Assessment is conservative in its approach and therefore intrusive ground investigation is recommended in order to confirm the CSM and quantify the potential pollutant linkage risks. The ground investigation should confirm the presence/nature and extent of infilled ground, potential contamination as a result of the historical presence of a waste transfer site, the groundwater and ground gas regime and include geo-environmental soil testing to assess the potential risks to human health and the environment including confirming the presence/absence of asbestos.

The Desk Study has identified potential geotechnical risks and constraints that should be further understood and addressed with consideration of the proposed specific development. On this basis a combined Geo-Environmental and Geotechnical Intrusive Ground Investigation is proposed to inform both planning / building control requirements and design considerations.

Following the ground investigation, a Phase II Interpretative Ground Investigative Report will be required to present the findings of the ground investigation, an updated CSM, and a review of the geotechnical considerations and geo-environmental risks and suitable mitigation measures.

Appendix A - Figures

Notes

1. Do not scale this drawing.
2. All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.

Legend

Proposed order limits

ISSUES & REVISIONS

Rev	Date	Details of issue / revision	Drw	Rev
P01	03.07.24	Issued for information	SRH	SRH

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Project Title: **EAST MIDLANDS GATEWAY 2 (EMG2)**

Drawing Title: **PROPOSED ORDER LIMITS**

Drawn:	S. Hilditch		Reviewed:	S.Hilditch		
BWB Ref:	220500	Date:	03.07.24	Scale@A1:	1:10,000	

Drawing Status: **FOR INFORMATION**

Project - Originator - Zone - Level - Type - Role - Number: **EMG2-BWB-GEN-XX-SK-CH-SK005**

Status: **S2**

Rev: **P01**

- Dimensions are in millimeters, unless stated otherwise.
- Scaling of this drawing is not recommended.
- It is the recipients responsibility to print this document to the correct scale.
- All relevant drawings and specifications should be read in conjunction with this drawing.

N

Key

- Application Boundary
- Strategic Landscape Proposals
- Existing Vegetation Retained
- Existing Tree Retained
- Existing Telecoms Mast
- Existing Public Right of Way / Footpath
- Proposed footpath
- Indicative Gradient
- Indicative location of proposed SUD's within open land/landscaping
- Existing Pond
- Proposed Bus stop
- Cycle Hire virtual Docking Station
- Existing Foul water easement [5m easement either side]
- Existing Overhead HV cables [3m easement either side]

Schedule of Accomodation

			Plot Areas	
Unit 1 Total	800,000 ft²	74,323 m²	39.41 ac	15.95 ha
Unit 2 Total	265,000 ft²	24,619 m²	11.86 ac	4.80 ha
Unit 3 Total	460,000 ft²	42,735 m²	25.74 ac	10.42 ha
Unit 4a Total	240,000 ft²	22,297 m²	10.85 ac	4.39 ha
Unit 4b Total	145,000 ft²	13,471 m²	7.85 ac	3.18 ha
Unit 5a Total	350,000 ft²	32,516 m²	16.00 ac	6.48 ha
Unit 5b Total	230,000 ft²	21,368 m²	11.75 ac	4.75 ha
Unit 6a Total	240,000 ft²	22,297 m²	12.71 ac	5.15 ha
Unit 6b Total	100,000 ft²	9,290 m²	5.12 ac	2.07 ha
Unit 7 Total	30,000 ft²	2,787 m²	1.98 ac	0.80 ha
Grand Total	2,860,000 ft²	265,703 m²	143.28 ac	57.98 ha
Pumping & Sub Station	TBC	TBC	0.61 ac	0.25 ha

DRAFT

rev	amendments	by	ckd	date

East Midlands Gateway, Phase 2

Illustrative Masterplan

SEGRO

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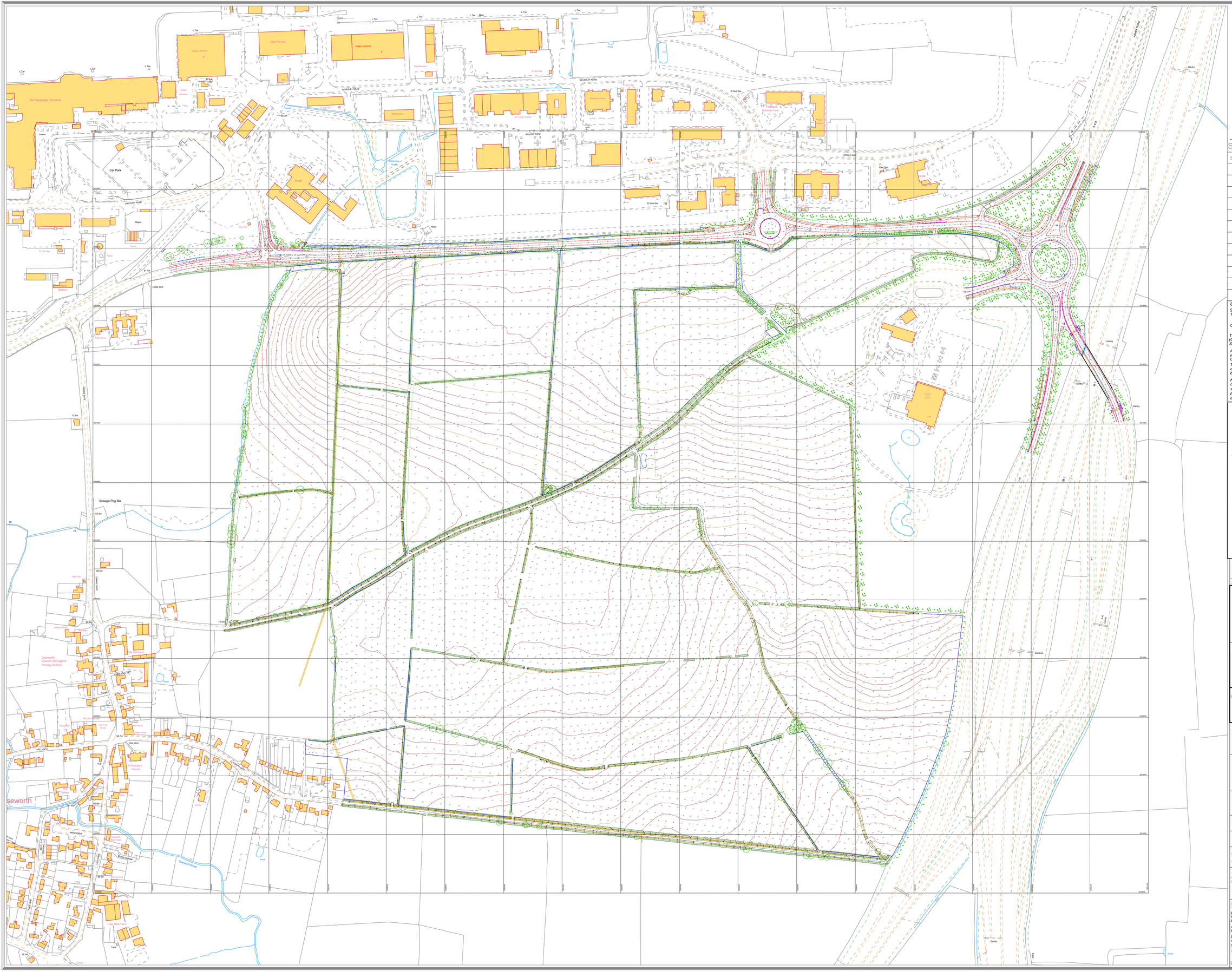
Drawing Status:	Feasibility
Drawn / Checked:	LM / MS
Date:	09/01/2024
Scale:	1:2500 A1
Drawing no:	Revision:
19232 F0053	

50m SCALE 1:2500


N
Station Information:
Station | Easting (m) | Northing (m) | Level (m)
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D2 | 446600.470 | 325437.555 | 88.372
D3 | 446736.974 | 325433.074 | 88.162
D4 | 446866.060 | 325436.925 | 86.081
D5 | 446878.948 | 325372.322 | 85.201
D6 | 446947.221 | 325448.280 | 84.444
GH2 | 446101.602 | 325402.684 | 84.812
GH3 | 445856.595 | 325399.844 | 81.922
N2 | 446987.475 | 325220.991 | 83.873
R1 | 445582.903 | 325381.6610 | 75.930
R2 | 445469.850 | 325374.391 | 79.274
SA1 | 446415.699 | 325424.224 | 87.303
OS Note:
Some services may have been omitted due to parked vehicles. The Ordnance Survey tile is to be used as a guide only.
OS Buildings
Surveyed Buildings
This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).
A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.
The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.
No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.
Please refer to Survey Station Table to enable establishment of the on-site grid and datum.
Legend:
Rev | Date | Description | Drawn | Ck. Rev
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Utility / CCTV Surveys
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Comments
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All dimensions should be checked on site prior to design and construction.
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Notes:
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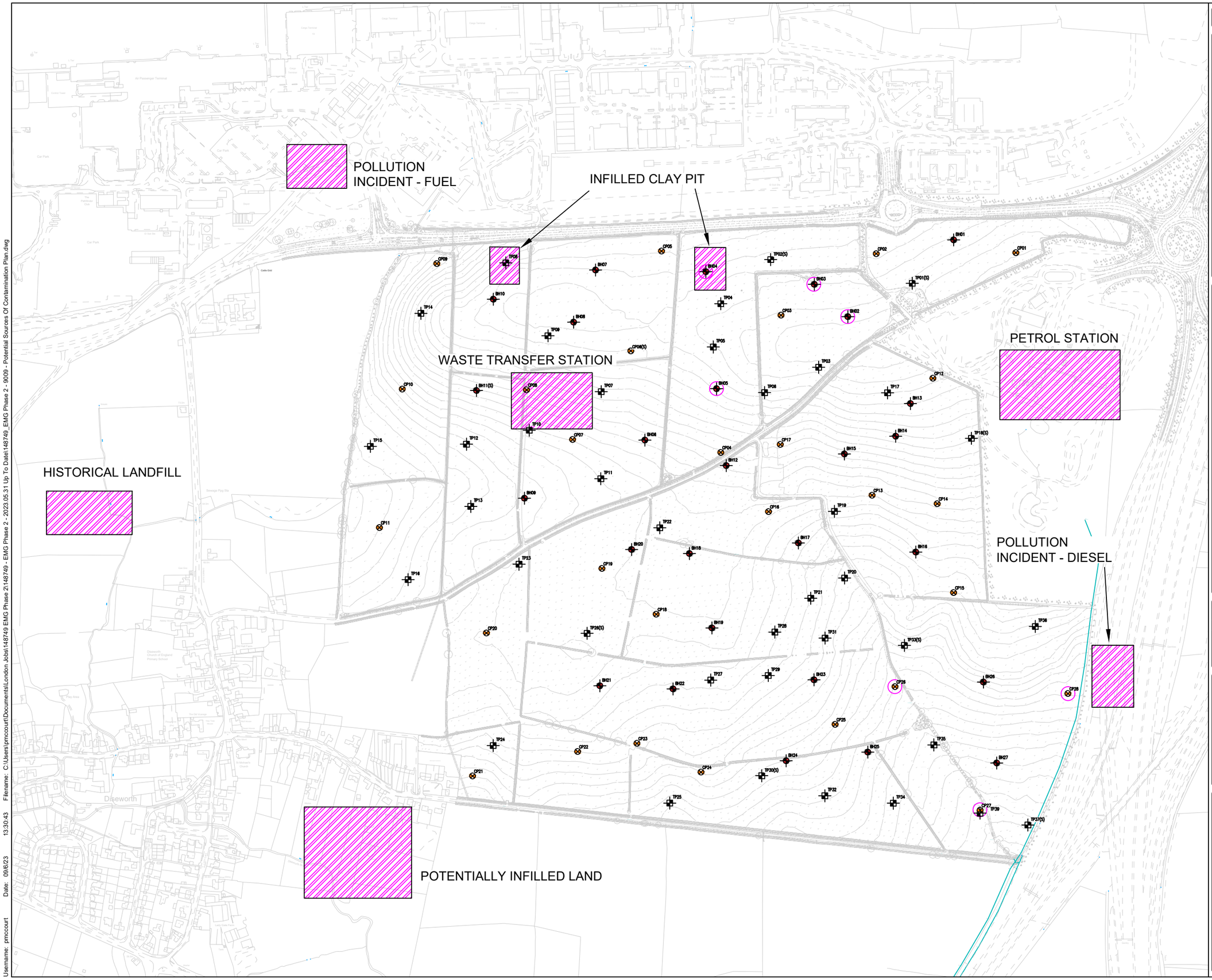


DO NOT SCALE FROM THIS DRAWING

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

RISKS LISTED HERE ARE NOT EXHAUSTIVE.
REFER TO DAF001.

CONSTRUCTION

MAINTENANCE

RESIDUAL DESIGN RISKS

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

NOTES
1. DESIGNER TO SET OUT WORKS PRIOR TO CONSTRUCTION.
2. DO NOT SCALE FROM THIS DRAWING.
3. DRAWING TO BE REPRODUCED IN COLOUR.
4. ALL DIMENSIONS IN m UNLESS OTHERWISE STATED.
5. ALLOWANCE TO BE MADE FOR 10 NO. BRE365 SOAKAWAY TESTS WITHIN TRIAL PITS AND 6 NO. FALLING HEAD TESTS WITHIN ROTARY FOLLOW ON POSITIONS

BH0 — ROTARY CORE BOREHOLE 30m

CP0 — CABLE PERCUSSIVE BOREHOLE 15m

TP01 — TRIAL PIT 3.5-4.0m

(S) — LOCATION OF SOAKAWAY

POTENTIAL SOURCE OF CONTAMINATION

Rev	Date	Description	Drawn	Chkd	Appd

Drawing Status: FOR INFORMATION

FAIRHURST
3rd Floor, The News Building, 3 London Bridge Street,
London, SE1 9SG
Tel: 0141 204 8800 Fax: 0141 204 8801

SEGRO

Project Title: EMG PHASE 2

Drawing Title: POTENTIAL SOURCES OF CONTAMINATION PLAN

Drawn	Date	Designed	Date
P. MCCOURT	09/06/23		
Checked	Date	Approved	Date

Scale	Fairhurst Ref
A3 NTS	148749

Drawing Number: 148749 - 9009 Revision: A

Appendix B - Landmark Envirocheck Report

Available as separate file

Appendix C - Correspondence

Tom Russell

From: GARETH REES <GARETH.REES@NWLeicestershire.gov.uk>
Sent: 07 June 2022 12:01
To: Tom Russell
Subject: 22/03499/EPENVS Re: EXTERNAL: 148749: Hyams Lane, Diseworth Environmental Enquiry

hi tom

thanks for your enquiry regarding the above site the response is as follows

- ***Details of any groundwater and surface water abstractions and their purpose, at the site and within a 1 km radius?;***
- the council does not hold this information
- ***Details of any landfills (current and / or historical) at the site and within 500 m, including any information on infill materials, dates of infilling, and any groundwater / ground gas monitoring data. Also, have there been any issues relating to land contamination for the respective landfills?***
- the council is aware of 2 to the west of the stie recorded on the EAs histric landfill database

FID 44
Shape Polygon
DI_ID HLF45
HLD_REF EAHLD22631
SITE_NAME Off Grimes Gate, Diseworth
SITE_ADD Off Grimes Gate, Diseworth, Leicestershire
WRC_REF 2400/1318
SITE_REF GDO 329, 72/2915/12
OS_PREFIX SK
EASTING 445200
NORTHING 324900
EA_REGION MI
EA_AREA Lower Trent MI
FIRSTINPUT 31/12/1960
LASTINPUT 31/12/1970
INERT Yes
INDUSTRIAL Yes

COMMERCIAL Yes
HOUSEHOLD Yes

FID 50
Shape Polygon
DI_ID HLF51
HLD_REF EAHLD28123
SITE_NAME Long Mere Lane, Diseworth
SITE_ADD Long Mere Lane, Diseworth, Leicestershire
WRC_REF 2400/1274
SITE_REF GDO 31
OS_PREFIX SK
EASTING 445000
NORTHING 324100
EA_REGION MI
EA_AREA Lower Trent MI
FIRSTINPUT 31/12/1920
LASTINPUT 31/12/1960
INERT Yes
COMMERCIAL Yes
HOUSEHOLD Yes
WASTECOM1 Soil, and hardcore.
MONITCOM1 No gas detected on surface

- ***Details of any contaminated land and pollution incidents at the subject site and within a 500 m radius?***
- the council is unaware of any
- ***If the site / portions of the site, and surrounding area within 1 km radius, are designated as contaminated land under Part 2a of the Environmental Protection Act 1990 (as amended), including whether and identifications are classified as Special Sites?;***
- the council has not declared any sites as meeting the definition
- ***Any information on mining/quarrying on-site or in the area;***
- the council is not aware of any
- ***Details of any water quality information at the site and within 500 m?;***
- the council does not hold this information
- ***Details of any information on groundwater flow direction beneath the site?;***
- the council does not hold this information
- ***Details of any further pertinent information relating to contaminated land / controlled waters at the site and within 1 km?; and***

- *the council is unaware of any*
- ***Details of any information on groundwater level at and within 500 m of the site?***
- the council does not hold this information

if you have any further queries please feel free to contact me

Gareth Rees MGEOL (HONS) FGS
Environmental Protection Officer (Contaminated Land and Air quality), Environmental Protection

Note I currently work at North West Leicestershire District Council on Mondays Tuesdays and alternate wednesdays

Direct Line: 01530 454 615
Mobile: 07976 431 236
email: gareth.rees@nwleicestershire.gov.uk

Twitter @NWLeics | Twitter @NWLEnviro | Facebook This is NWLeics | www.nwleics.gov.uk

Council Offices, Whitwick Road, Coalville, Leicestershire, LE67 3 FJ

From: ENVIRONMENTAL PROTECTION <ENVIRONMENTAL.PROTECTION@NWLeicestershire.gov.uk>
Sent: 26 May 2022 15:23
To: GARETH REES <GARETH.REES@NWLeicestershire.gov.uk>
Subject: FW: EXTERNAL: 148749: Hyams Lane, Diseworth Environmental Enquiry

Hi Gareth

One for you please.

Thanks

Leigh Oliver BSc (Hons) MCIEH CEnvH
Chartered Environmental Health Practitioner, Public Protection Team Leader, Environmental Protection Team

01530 454577 | leigh.oliver@nwleicestershire.gov.uk | www.nwleics.gov.uk
Twitter @NWLeics | Facebook This Is NWLeics

I work for an agile organisation and sometimes work outside of traditional office hours. I don't expect an immediate response to my email – please reply at a convenient time for you.

INVESTORS IN PEOPLE
We invest in people Silver

From: Tom Russell <tom.russell@fairhurst.co.uk>
Sent: 25 May 2022 09:32
To: ENVIRONMENTAL PROTECTION <ENVIRONMENTAL.PROTECTION@NWLeicestershire.gov.uk>
Subject: EXTERNAL: 148749: Hyams Lane, Diseworth Environmental Enquiry

Good Afternoon,

I am currently writing a desk study for a site at Hyam's Lane, Diseworth, approximate postcode DE74 2TN (site plan attached). Can you please provide information on the environmental setting for the site from your records, including information on:

- Details of any groundwater and surface water abstractions and their purpose, at the site and within a 1 km radius?;
- Details of any landfills (current and / or historical) at the site and within 500 m, including any information on infill materials, dates of infilling, and any groundwater / ground gas monitoring data. Also, have there been any issues relating to land contamination for the respective landfills?;
- Details of any contaminated land and pollution incidents at the subject site and within a 500 m radius?;
- If the site / portions of the site, and surrounding area within 1 km radius, are designated as contaminated land under Part 2a of the Environmental Protection Act 1990 (as amended), including whether and identifications are classified as Special Sites?;

- Any information on mining/quarrying on-site or in the area;
- Details of any water quality information at the site and within 500 m?;
- Details of any information on groundwater flow direction beneath the site?;
- Details of any further pertinent information relating to contaminated land / controlled waters at the site and within 1 km?; and
- Details of any information on groundwater level at and within 500 m of the site?

Kind regards,

Tom

Tom Russell
MSc AMIEnvSc
Geo-Environmental Engineer
Geotechnical & Geo-Environmental

FAIRHURST
engineering solutions, delivering results

3rd Floor
The News Building
3 London Bridge Street
London, SE1 9SG

Tel: 020 7828 8205

Website: www.fairhurst.co.uk @fairhurstlondon

You can report, request and pay for things online at www.nwleics.gov.uk

Appendix D - BGS Borehole Records

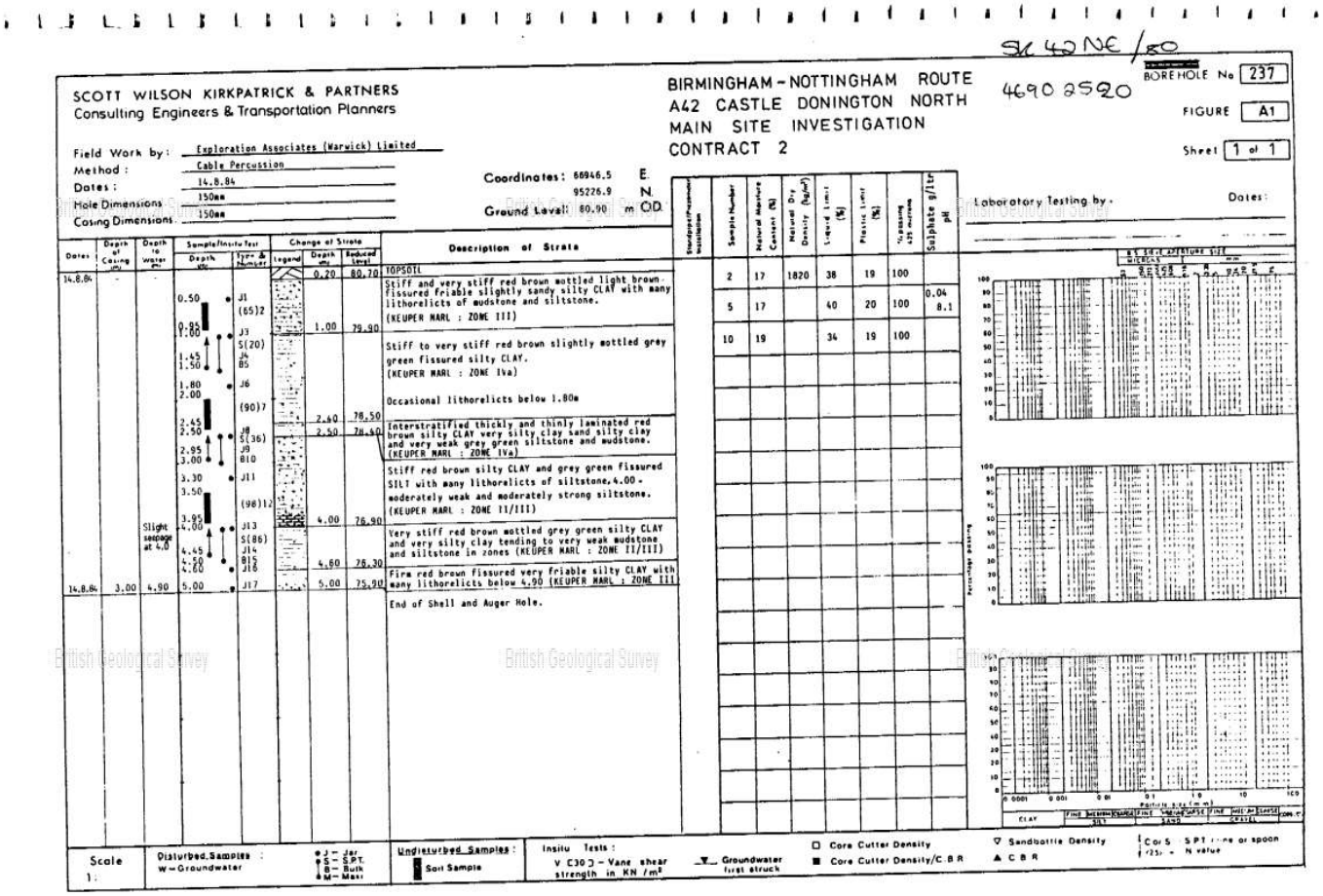
British Geological Survey

Version 2.0.6.6

BGS ID: 218220 : BGS Reference: SK42NE80
British National Grid (27700) : 446900,325200

Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>



SK 42 NE /80

SCOTT WILSON KIRKPATRICK & PARTNERS
Consulting Engineers & Transportation Planners

BIRMINGHAM – NOTTINGHAM ROUTE
A42 CASTLE DONINGTON NORTH
MAIN SITE INVESTIGATION
CONTRACT 2

4690 2520

BOREHOLE No 237
FIGURE A1
Sheet 1 of 1

Field Work by: Exploration Associates (Warwick) Limited
Method: Cable Percussion
Dates: 14.8.84
Hole Dimensions: 150mm
Casing Dimensions: 150mm

Coordinates: 86946.5 E
95226.9 N
Ground Level: 80.90 m OD

Laboratory Testing by: Dates:

Dates	Depth of Casing (m)	Depth to Water (m)	Sample/Insitu test Depth (m)	Sample/Insitu test Type & Number	Change of Strata Legend	Depth (m)	Reduced Level	Description of Strata
14.8.84			0.50	J1		0.20	80.70	TOPSOIL
			0.80	(65)2				Stiff and very stiff red brown mottled light brown fissured friable slightly sandy silty CLAY with many lithorelicts of mudstone and siltstone. (KEUPER MARL : ZONE III)
			1.00	J3		1.00	79.90	
			1.45	S(20)				Stiff to very stiff red brown slightly mottled grey green fissured silty CLAY. (KEUPER MARL : ZONE IVa)
			1.50	J4 B5				
			1.80	J6				Occasional lithorelicts below 1.80m
			2.00	(90)7		2.40	78.50	
			2.45			2.50	78.40	Interstratified thickly and thinly laminated red brown silty CLAY very silty clay sand silty clay and very weak grey green siltstone and mudstone. (KEUPER MARL : ZONE IVa)
			2.50	J8				
			2.95	S(36) J9				Stiff red brown silty CLAY and grey green fissured SILT with many lithorelicts of siltstone, 4.00 - moderately weak and moderately strong siltstone. (KEUPER MARL : ZONE II/III)
			3.00	B10				
			3.30	J11				
			3.50	(98)12				
			3.95	J13		4.00	76.90	
		Slight seepage at 4.0	4.00	S(86)				Very stiff red brown mottled grey green silty CLAY and very silty clay tending to very weak mudstone and siltstone in zones (KEUPER MARL : ZONE II/III)
			4.45	J14				
			4.50	B15		4.60	76.30	
			4.60	J16				Firm red brown fissured very friable silty CLAY with many lithorelicts below 4.90 (KEUPER MARL : ZONE III)
14.8.84	3.00	4.90	5.00	J17		5.00	75.90	End of Shell and Auger Hole.

Standpipe/Piezometer Installation	Sample Number	Natural Moisture Content (%)	Natural Dry Density (kg/m³)	Liquid Limit (%)	Plastic Limit (%)	% passing 425 microns	Sulphate g/litre	pH
	2	17	1820	38	19	100		
	5	17		40	20	100	0.04	8.1
	10	19		34	19	100		

Scale 1:

Disturbed Samples: J – Jar, S – SPT, B – Bulk, M – Mast
W – Groundwater

Undisturbed Samples: Soil Sample

Insitu Tests: V C30 – Vane shear strength in KN/m²

Groundwater first struck

Core Cutter Density
Core Cutter Density/C B R

Sandbottle Density
C B R

Cor S SPT – line or spoon
N value

Version 2.0.6.6

BGS ID: 218221 : BGS Reference: SK42NE81
British National Grid (27700) : 446890,325330

Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>

SK42NE/81

SCOTT WILSON KIRKPATRICK & PARTNERS
Consulting Engineers & Transportation Planners

BIRMINGHAM - NOTTINGHAM ROUTE
A42 CASTLE DONINGTON NORTH
MAIN SITE INVESTIGATION
CONTRACT 2

4689 2533

[redacted] BOREHOLE No 275

FIGURE A1

Sheet 1 of 1

Field Work by: Exploration Associates (Warwick) Limited
Method: Cable Percussion
Dates: 16.8.84
Hole Dimensions: 150mm
Casing Dimensions: 150mm

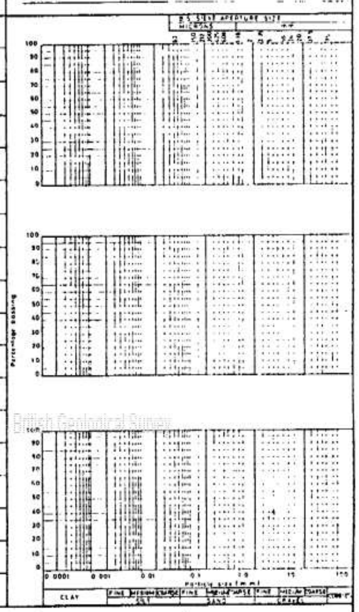
Coordinates: 66924.1 E. 95366.7 N.
Ground Level: 84.29 m O.D.

Laboratory Testing by: Dates:

Dates	Depth of Casing (m)	Depth to water (m)	Sample/Insitu Test Depth (m)	Type & Number	Change of Strata Depth (m)	Reduced Level	Description of Strata
16.8.84		–	0.40	J1			Very stiff red brown, brown silty CLAY with sub-angular fine to medium gravel (fragments of siltstone and sandstone) and carbonaceous material (GLACIAL TILL)
			0.50–0.95	(70)2			
			1.00	J3	1.00	83.29	
			1.00–1.45	S(22) J4			Stiff and very stiff red brown mottled grey green fissured silty CLAY occasional lithorelicts and carbonaceous material. (KEUPER MARL : ZONE III)
		slight seepage 2.50	2.00–2.45	(65)5			
			2.50	J6	2.50	81.79	
		Sealed off at 4.5m	2.50–2.95	S(26) J7			Firm red brown mottled grey green fissured silty CLAY with occasional pockets of sand and lithorelicts. Bands of very weak laminated mudstone and weak to moderately weak siltstone at 2.50m and 4.00m (KEUPER MARL : ZONE III)
			3.30	J8			
			3.50–3.95	(85)9			
			4.00–4.45	S(111) J10	4.70	79.59	
16.8.84	4.50	Dry	5.00	J11	5.00	79.29	Soft red brown friable very silty CLAY tending to clayey silt with many lithorelicts of mudstone and siltstone. (KEUPER MARL : ZONE III)
							End of Shell and Auger Hole.

Standpipe/Piezometer Installation	Sample Number	Natural Moisture Content (%)	Natural Dry Density (kg/m³)	Liquid Limit (%)	Plastic Limit (%)	% passing 425 microns	Sulphate g/ltr pH
	2	19		41	21	100	
	4	15					
	5	14 20**		32	17	100	0.06 8.1
	7	16		35	17	100	

** Microwave Determination



Scale 1:
Disturbed Samples: W – Groundwater; J – Jar; S – S.P.T.; B – Bulk; M – Mazi
Undisturbed Samples: Soil Sample
Insitu Tests: V [30] – Vane shear strength in KN/m²
Groundwater first struck
□ Core Cutter Density
■ Core Cutter Density/C.B.R
∇ Sandbottle Density
▲ C B R
C or S S.P.T. cone or spoon; (25) – N value

SK 45266 25262

SK42NE/156.

Sampling		Properties			Strata			
Depth	Type	Strength kN m²	w %	SPT N	Description	Depth	Level	Legend
					Turf over TOPSOIL	G.L	76.47	
0.40	D				Firm stiff brown and red brown silty very sandy CLAY with roots and occasional fine medium sub-angular - rounded rock fragments and gravel.	0.30	76.17	
0.50-0.95	U(30)	95	21					
1.50	D		16			1.20	75.27	
2.00-2.45	U(75)	110	16		Firm-stiff light red brown silty sandy CLAY with frequent fine-medium sub-rounded-rounded rock fragments and gravel. Slightly friable.			
2.45	D					2.30	74.17	
3.00	D		18		Very stiff - hard friable red brown becoming grey brown silty sandy CLAY with abundant fine-medium weathered rock fragments and rounded gravel. Zones of weaker red brown friable very sandy clay noted at 2.45.			
3.50-4.00	U(100)	145	16					
3.95	D		16			3.90	72.57	
4.50	D		15		Very stiff to hard dark grey and dark grey brown fissured silty slightly sandy CLAY with abundant fine-medium rock fragments, rounded gravel, and fine pockets of silt or sand (completely weathered rock fragments).			
5.0-5.40	U(120)							
6.00	D		13					
6.35	S**							
6.40	D							
Drill Run	Fluid Return	Core Recovery	FI	RQD		6.50	69.97	
7.20	100%	100%	-	-	Strong grey and grey green limestone and siltstone BOULDERS (< 0.3 thick), with layers of very stiff dark red brown sandy CLAY, and fine medium and coarse sandstone, siltstone, flint and quartitu rounded - sub-rounded gravel towards base.			
7.80	100%	100%	-	-				
8.30	100%	100%	-	-				
8.70	100%	100%	-	-				
8.80	100%	70%	-	-				
9.50	100%	100%	-	-				
9.80	100%	100%	-	-	Continued from 10.00	10.00	66.47	

Drilling

Type	From	To	Size	Fluid
Shell & Auger	G.L	6.50	0.15	-
Rotary Core	6.50	15.00	0.072	water

Ground Water

Struck	Behaviour	Sealed	Date	Hole	Cased	Water
	Stood at 5.40 overnight		18.3.81	GL	-	-
			18.3.81	4.50	NIL	NIL
			19.3.81	9.50	6.0	GL

Remarks Rock Chisel used to penetrate boulder 4.30-4.40 (0.5 hours) and 4.50-5.0 hard strata from 6.35-6.50
**No penetration possible

Borehole Record

exploration associates

Project Department of Transport
A564 Stoke - Derby Link
Derby Southern By Pass
Isley Walton to M1 Section
Preliminary Site Investigation

Contract S2796

Borehole B9

Sheet 1 of 2

EX1

SK 42 NE/156

Sampling		Properties			Strata			
Drill Run	Fluid Return	Core Recovery	FI	RQD	Description	Depth	Level	Legend
10.00					Continued from 10.00	10.00	66.47	
	100%	*	-	-	as above but with rounded and angular limestone, quartz and sandstone gravel in matrix of firm silty clay			
10.50	100%	100%	-	-				
10.90	100%	100%	-	-				
11.00	100%	100%	15	30		11.10	65.37	
11.50	100%	95%	4	70	Dark reddish brown, fine grained very thinly bedded moderately weathered silty MUDSTONE weak to moderately weak, closely spaced joints with more highly weathered zones of firm silty CLAY and occasional bands of medium strong to strong siltstone (80mm)			
13.00	100%	100%	>25	50	As above but slightly weathered and joints <20mm to 150mm i.e. extremely closely spaced to closely spaced.	13.00	63.47	
14.00	100%	100%	10	35				
15.00					End of Borehole	15.00	61.47	

Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
								23.3.81	10.50	10.00	G.L
								24.3.81	15.00	10.50	G.L

Remarks *Gravel and cobbles recovered after 15 attempts to core
Note: Most joints horizontal. Bedding within 5° of horizontal

Borehole Record

exploration associates

Project Department of Transport
A564 Stoke – Derby Link
Derby Southern By Pass
Isley Walton to M1 Section
Preliminary Site Investigation

Contract S2796

Borehole B9

Sheet 2 of 2

EX1a

SK 45407 25338 .

SK 42NE/157.

Sampling		Properties			Strata			
Depth	Type	Strength kN m²	w %	SPT N	Description	Depth	Level	Legend
					Turf over TOPSOIL	G.L	83.77	
0.30	D					0.20	83.57	
0.50–0.90	U(70)	80	19		Soft–firm light brown and brown silty sandy CLAY with fine–medium strong angular rock fragments and fine gravel.			
					BOULDER	0.90	82.87	
1.60	D		9		Firm–Stiff friable light brown silty very sandy CLAY with fine medium and coarse angular rock fragments and gravel.	1.50	82.27	
2.00–2.45	SD			44				
2.80	D					2.80	80.97	
3.00–3.35	U(75)		19		Soft–firm very friable light red brown very silty fine sandy CLAY/clayey sandy SILT and fine SAND. Shear surfaces within the silty CLAY.			
3.80	D		21		Firm friable red brown coarse sandy CLAY with black carbonaceous fragments.	3.70	80.97	
4.50–4.95	U(80)							
					(Very dense) matrix of very stiff brown red brown and grey brown silty sandy CLAY, fine medium and coarse angular rock fragments, GRAVEL and COBBLES.	4.80	78.97	
5.50	D							
6.00	SD		9	**				
7.30	S			**				
8.30	D					8.30	75.47	
8.50–8.65	SD		15	200+	Very weak weathered dark red brown SILTSTONE	8.50	75.27	
Drill Run	Fluid Return	Core Recovery	FI	RQD				
	100%	85%	>25	NIL	As above, though broken in a matrix of firm silty clay and containing several pieces of rounded quartz gravel ***			
9.70–9.75	SD			300+	See over	9.5	74.27	
					Continued from 10.00	10.00	73.77	

Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
Shell & Auger	G.L	7.30	0.15	–	NIL	Water flush returns lost at 11.00		25.3.81	G.L	–	–
Rotary Core	7.30	7.50	0.072	water							
Shell & Auger	7.50	8.50	0.15	–				25.3.81	7.00	7.00	NIL
Rotary Core	8.50	13.00	0.072	water				26.3.81	8.5	8.3	7.3
								27.3.81	13.0	8.3	NIL

Remarks Rock chisel used from 0.9–1.5, 3.4–3.6, 5.0–5.8 (5.5 hours) 7.0–7.3, 7.5–8.5 (4 hours)
** No penetration. Standpipe installed to 13.0m with bottom 2m perforated and surounded with gravel
***May be disturbed from casing installation

Borehole Record

exploration associates

Project Department of Transport
A564 Stoke – Derby Link
Derby Southern By Pass
Isley Walton to M1 Section
Preliminary Site Investigation

Contract S2796

Borehole 10

Sheet 1 of 2

EX1

SK 42 NE/157

Sampling		Properties			Strata			
Drill Run	Fluid Return	Core Recovery	FI	RQD	Description	Depth	Level	Legend
	100%	75%	15	35	Continued from 10.00 Dark reddish brown fine grained, very thinly bedded mod-highly weathered silty MUDSTONE - very weak, occasional moderately weak, extremely closely bedded (<20) with bands of grey green strong SILTSTONE.	10.00	73.77	
11.00	NIL	100%	10	65				
11.50	NIL	60%	clay	clay	Dark reddish brown silty CLAY with mudstone fragments.	11.60	72.17	
12.00	NIL	90%	15	NIL	Dark reddish brown becoming grey green fine grained highly weathered silty MUDSTONE becoming siltstone very weak with extremely closely spaced predominant horizontal joints. 2 vertical joints noted with bands of grey green strong siltstone and bands of completely weathered siltstone and bands of firm silty CLAY (up to 200mm).	12.00	71.77	
13.00					End of Borehole	13.00	70.77	

Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water

Remarks Bedding with 5° of horizontal

Borehole Record

exploration associates

Project Department of Transport
A564 Stoke - Derby Link
Southern Derby By Pass
Isley Walton to M1 Section
Preliminary Site Investigation

Contract S2796

Borehole 10
Sheet 2 of 2

EX1a

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
M1 WIDENING JUNCTION 21 TO 30 PRELIMINARY GI - CONTRACT 2	RC1075

Machine:	Casing Diameter	Ground Level (mOD)	Client	Job Number
Flush :	140mm cased to 2.25m	84.85	Highways Agency	WAL060099
Core Dia: mm	Location	Dates	Engineer	Sheet
Method :	446944 E 325439 N	23/01/2007-24/01/2007	Arup	1/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	PIT		0	0	Groundwater was not apparent during boring(1) at 0.00m.			Inspection Pit.		▽1
	O/H		0	0			(1.20)			
1.20	93	0	0	0		83.65	1.20	Open Hole.		
					23/01/2007:DRY		(1.00)			
2.20			0	0	23/01/2007: 23/01/2007:	82.65	2.20 (0.75)	Firm locally fissured red brown slightly gravelly CLAY. Gravel is subrounded, fine to coarse of mudstone.		
2.95	93	0	0	0	24/01/2007: 25/21,37,44,50 SPT 25'/75 152/247	81.90	2.95	Between 2.85m and 2.95m; moderately weak, light grey siltstone.		
3.60-3.92 3.60	87	12	0	0				Stiff CLAY to very weak, red brown MUDSTONE, with widely spaced very thin to thin beds of light grey moderately strong siltstone. Discontinuities: extremely closely and very closely spaced, randomly orientated, rough and smooth, occasionally stained black.		
5.10-5.36 5.10	100	8	0	0	25/27,39,50 SPT 25'/75 116/186 P1			From 5.10m to 5.30m; assumed zone of core loss.		
6.00							(6.65)			
6.60-6.72 6.60	78	10	7	0	25/50 SPT 25'/75 50/42					
8.10-8.19 8.10	100	32	10	0	25/50 SPT 25'/75 50/18 P2			From 8.10m to 8.43m; assumed zone of core loss.		
9.05										
9.60-9.71 9.60					25/50 SPT 25'/75 50/32	75.25	9.60	Weak variably stiff clay to moderately weak, red brown MUDSTONE, with widely spaced very thin and thin beds of weak and moderately strong, light grey SILTSTONE.		

Remarks

Scale (approx)	Logged By
1:50	OP

Figure No.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
M1 WIDENING JUNCTION 21 TO 30 PRELIMINARY GI - CONTRACT 2	RC1075

Machine:	Casing Diameter	Ground Level (mOD)	Client	Job Number
Flush :	140mm cased to 2.25m	84.85	Highways Agency	WAL060099
Core Dia: mm				
Method :	Location	Dates	Engineer	Sheet
	446944 E 325439 N	23/01/2007-24/01/2007	Arup	2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	67	15	0	0				Moderately to widely interbedded zone I and zone II. Discontinuities: zone II areas - extremely closely fractured, randomly orientated, rough and smooth. Zone I areas - vertical, undulating, rough, occasionally black staining and clay infill, very closely to medium spaced. Horizontal and subhorizontal, rough and smooth, clean, moderately to widely spaced, 60 degrees, rough, with some black staining.		
10.90					P3					
11.10					25/50			From 11.10m to 11.60m; assumed zone of core loss.		
11.10-11.20					SPT 25*/75 50/21					
	97	26	9	0						
12.60										
13.10	100	40	15	0	P4		(7.60)			
14.10					25/50					
14.10-14.21					SPT 25*/75 50/37					
14.80	100	38	23	0	P5					
15.60										

Sample / Tests	Casing Depth (m)	Water Depth (m)
16.84-17.20 U6		

					24/01/2007:DRY	67.65	17.20			
					24/01/2007:			Complete at 17.20m		

Remarks

Scale (approx)	Logged By
1:50	OP

Figure No.

British Geological Survey

Version 2.0.6.6

BGS ID: 18913774 : BGS Reference: SK42NE711
British National Grid (27700) : 446847,325114

Report an issue with this borehole

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Trial Pit Number
M1 WIDENING JUNCTION 21 TO 30 PRELIMINARY GI - CONTRACT 2	TP1069

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit		82.45	Highways Agency	WAL060099
	Location	**Dates**	**Engineer**	**Sheet**
	446847 E 325114 N	12/10/2006	Arup	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
			Trial pit was damp with dripping water at 2.80m(1) at 0.00m.	82.25	(0.20) 0.20	Grey brown slightly gravelly clayey TOPSOIL with frequent rootlets. Gravel is medium to coarse, subangular to subrounded of sandstone.		▽1
0.50	B1				(0.60)	Soft to firm orange brown slightly sandy gravelly CLAY. Gravel is medium to coarse, subangular to subrounded of sandstone, quartz and occasional to some subangular to subrounded cobbles of quartz and sandstone. Occasional roots.		
1.00	B2			81.65	0.80			
1.50	D3				(2.00)	Firm to stiff pink brown locally slightly sandy CLAY with occasional to some mudstone lithorelics, locally friable. Occasional cobble sized pockets of green grey silt.		
2.00	B4					At 1.80m; pocket of slightly clayey medium grained sand. From 1.90m; locally laminated clay with frequent lithorelics. Occasional bands (up to 40mm thick) of moderately strong sandstone/siltstone.		
2.50	D5					Below 2.50m; locally a weak siltstone.		
3.00	B6			79.65	2.80	At 2.80m; damp. Orange pink brown weak to moderately strong SILTSTONE. Retrieved as a silt with frequent lithorelics and cobbles of siltstone. Some bands of grey green siltstone.		
3.50	D7				(1.20)			
4.00	B8		12/10/2006:	78.45	4.00			
			12/10/2006:			Complete at 4.00m		

Plan

Remarks

Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. Services were not encountered.;No visual or olfactory indication of contamination was observed.;On completion the trial pit was backfilled with compacted arisings. ;

Scale (approx)	Logged By	Figure No.
1:50	MW	

SK 42 SE/155

SCOTT WILSON KIRKPATRICK & PARTNERS
Consulting Engineers & Transportation Planners

BIRMINGHAM – NOTTINGHAM ROUTE
A42 CASTLE DONINGTON NORTH 4672 2435
MAIN SITE INVESTIGATION
CONTRACT 2

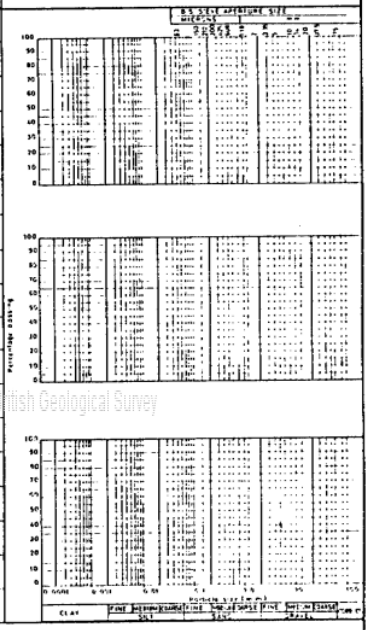
BOREHOLE No 232
FIGURE A1
Sheet 1 of 1

Field Work by: Exploration Associates (Warwick) Limited
Method: Cable Percussion
Dates: 24.8.84
Hole Dimensions: 150mm
Casing Dimensions: 150mm

Coordinates: 86742.8 E.
94392.8 N.
Ground Level: 54.84 m OD.

Laboratory Testing by: Dates:

Dates	Depth of Casing (m)	Depth to Water (m)	Sample/Insitu Test Depth (m)	Sample/Insitu Test Type & Number	Change of Strata Legend	Change of Strata Depth (m)	Change of Strata Reduced Level	Description of Strata	Standpipe/Piezometer Installation	Sample Number	Natural Moisture Content (%)	Natural Dry Density (kg/m³)	Liquid Limit (%)	Plastic Limit (%)	% passing 425 microns
24.8.84	-	-				0.10	54.74	TOPSOIL							
			0.50	J1		0.50	54.34	Stiff brown silty CLAY. (GLACIAL TILL)		2	15	1840	31	19	100
			0.95	(35)2				Stiff red brown mottled light brown silty CLAY with many mudstone lithorelicts. (KEUPER MARL : ZONE III		6	16	1910			
			1.00	J3		1.00	43.84								
			1.45	S(20) J4				Stiff red brown and grey green fissured silty CLAY and very silty clay with many mudstone and siltstone lithorelicts. (KEUPER MARL : ZONE II/III) Very stiff in parts. Bands of weak and very weak mudstone and siltstone below 2.50m		9	19				
			1.80	J5						11	15 16				
			2.00	(70)6											
			2.45	J7											
			2.50	S(53) J8											
			2.95	J9		3.30	51.54								
			3.30	(85)11				Stiff red brown mottled grey green highly fissured silty CLAY with many mudstone lithorelicts and occasional bands of weak and very weak siltstone (KEUPER MARL : ZONE II/III)							
		Slight seepage at 4.45	2.95	S(72) J11											
			4.45	J12											
			4.90			5.50	49.34								
			5.50	S(107) J13				Weak and very weak red brown slightly mottled grey green fissured MUDSTONE. (KEUPER MARL : ZONE I)							
			5.95	J14											
			6.20	S(89 for 150mm)* J15											
			6.50												
24.8.84	6.00	Dry	6.95			7.00	47.84	End of Shell and Auger Hole. * Seating Blows – J15 = 34							



Scale 1:

Disturbed Samples : W – Groundwater ● J – Jar ● S – S.P.T. ● B – Bulk ● M – Mazi

Undisturbed Samples : Soil Sample

Insitu Tests : V C30 J – Vane shear strength in KN /m² ▼ Groundwater first struck

□ Core Cutter Density ■ Core Cutter Density/C.B.R ▽ Sandbottle Density ▲ C.B.R

C or S S.P.T. – ne or spoon (25) – N value

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
M1 WIDENING JUNCTION 21 TO 30 PRELIMINARY GI - CONTRACT 2	RC1064

Machine:	Casing Diameter	Ground Level (mOD)	Client	Job Number
Flush :	140mm cased to 3.00m	62.30	Highways Agency	WAL060099
Core Dia: mm	Location	Dates	Engineer	Sheet
Method :	446759 E 324588 N	18/01/2007	Arup	1/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	PIT		0	0				Inspection Pit.		
	OH		0	0			(1.20)			
1.20						61.10	1.20	Open Hole.		
	61	4	0	0			(1.80)			
3.00						59.30	3.00	Generally stiff to very stiff (variably very weak mudstone with depth) extremely closely fissured red brown locally mottled grey green slightly gravelly CLAY. Gravel is angular to subangular, fine to medium lithorelics of mudstone.		
	80	0	0	0				Between 3.90m and 4.50m; assumed zone of core loss.		
4.50-4.88					25/11,14,19,21 SPT 25'/75 N=65					
4.50							(3.50)			
	60	0	0	0						
6.00-6.18					25/26,50 SPT 25'/75 76/106					
6.00			0	0				Between 6.00m and 6.50m; non intact.		
6.50			0	0		55.80	6.50	Generally very weak (variably very stiff clay to moderately weak) red brown calcareous MUDSTONE with rare very thin beds of moderately weak light grey green siltstone. Recovered in very thin beds as very clayey angular fine to medium gravel . Fractures: where evident subvertical, extremely closely spaced, planar to irregular.		
6.90								Between 6.90m and 7.50m; assumed zone of core loss.		
	100	0	0	0			(1.60)			
7.50-7.69					25/39,50 SPT 25'/75 89/117					
7.50			0	0				Between 7.50m and 7.80m; non intact.		
7.80			0	0	Water strike(1) at 8.00m, no rise after 20 mins.					▼1
8.10						54.20	8.10	Generally moderately weak (variably weak to moderately strong) red brown calcareous MUDSTONE. Fractures: horizontal, extremely closely to closely spaced, smooth, planar with soft clay infill up to 5mm; subvertical, locally very closely spaced, smooth, planar; frequent others irregular, apparently random strike.		
	97	47	21	0						
9.00-9.09					25/50 SPT 25'/75 50/10 P1					
9.00								Between 9.00m and 9.90m; with closely spaced very thin beds of moderately weak grey green siltstone; fractures are horizontal, very closely to closely spaced, planar; rare subvertical, planar fractures.		
9.20			0	0			(2.80)			
9.90										

Remarks

Scale (approx)	Logged By
1:50	TL

Figure No.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
M1 WIDENING JUNCTION 21 TO 30 PRELIMINARY GI - CONTRACT 2	RC1064

Machine:	Casing Diameter	Ground Level (mOD)	Client	Job Number
Flush :	140mm cased to 3.00m	62.30	Highways Agency	WAL060099
Core Dia: mm				
Method :	Location	Dates	Engineer	Sheet
	446759 E 324588 N	18/01/2007	Arup	2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	100	36	34	0						
							(2.80)			
10.50					25/37,50					
10.50-10.68			0	0	SPT 25'/75 87/100			Between 10.45m and 10.60m; thin bed of stiff friable silt/clay.		
10.65					P2	51.40	10.90			
10.90			0	0				Moderately strong light grey green locally mottled red brown SILTSTONE with occasional rounded fine gravel size dissolution vugs. Fractures: subhorizontal, very closely to medium spaced, planar; vertical generally irregular.		
				0						
11.45			0							
11.60	87	75	53	0			(1.95)			
12.00										
12.00-12.32			0	0	U3					
12.75					P4	49.45	12.85			
12.85	91	50	24	0				Weak to moderately weak red brown locally mottled grey green calcareous MUDSTONE with medium spaced thin beds of moderately strong light grey green siltstone. Fractures: horizontal, very closely to closely spaced, planar, occasionally undulating; subvertical, locally very closely spaced, planar to irregular; others irregular, apparently random strike.		
13.50	Sample / Tests		Casing Depth (m)	Water Depth (m)						
							(2.15)			
14.05	P5									
					18/01/2007:	47.30	15.00			
					18/01/2007:			Complete at 15.00m		

Remarks

Scale (approx)	Logged By
1:50	TL

Figure No.

Appendix E –Site Walkover Photographs

Photo 1 – View of the central field, to the north of Hyam's Lane, facing northwards. Wheat can be seen being grown in the background.

Photo 2 – View of the central field, to the north of Hyam's Lane, facing eastwards. Desiccated soils can be seen in the foreground.

Photo 3 – View central field, to the north of Hyam's Lane, taken from the north of the site, facing southwards.

Photo 4 – View of the western fields, nroth of Hyam's Lane, facing southwards. Overhead power cables, that extend north to south, can be seen at the top of the photo.

Photo 5 – A cobble of conrete observed in the south-eastern field, south of Hyam's Lane.

Photo 6 – Brick and concrete observed in the south-eastern field, south of Hyam's Lane.

Photo 7 – Dried green manure which had been spread onto the southern fields, south of Hyam's Lane, used for maize growing.

Photo 8 – The drainage ditch in the south-east of the site. The drain was dry at the time of the site visit.

Photo 9 – View of the central-southern field, facing westwards. Maize can be seen being grown.

Photo 10 – View of an access track extending northwards from Long Holden, in the south-west of the site. Maize can be seen being grown on the right of the photo.

Photo 11 – View of the south-easternmost field, south of Hyam's Lane. The field, where the photo was taken, and the maize field in the background are seperated by the drainage ditch, as seen in Photo 8.

Photo 12 – View of Hyam's Lane facing westwards.

Appendix F - Principles of Environmental Risk Assessment

Principles of Environmental Risk Assessment

The Environmental Protection Act 1990, Part II A Contaminated Land (Section 57 of the Environment Act 1995) and the Contaminated Land Regulations 2006 (and 2012 amendments) provide a basis on which to determine the risks and liabilities presented by a contaminated site. Contaminated Land is defined within Section 78A(2) of the Environmental Protection Act 1990, Part II A Contaminated Land (by commencement of Section 86 of The Water Act 2003 [Commencement Order No. 11] Order 2012) as:

"Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that-

(a) Significant harm is being caused or there is significant possibility of such harm being caused; or

(b) Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused."

Section 57 of the Environment Act 1995 requires that any site identified as being "contaminated" by the Local Authority will be registered by them and remediation will be required to render the site fit for use.

The presence of contamination is not the sole factor for deciding whether a site is contaminated. Relevant parties should identify site-specific risks and provide objective, cost-effective methods to manage the contamination in a manner which satisfies the proposed end-use.

A risk-based approach, which takes both technical and non-technical aspects into consideration when making decisions on contamination resulting from past, present or future human activities, is advocated. The assessment of environmental risks generally relies on the identification of three principal elements forming a 'pollutant or contaminant linkage':

Source: the contaminant

Pathway: the route through which the contaminant can migrate, and

Receptor: all human, animal, plant, controlled water or property that may be adversely affected (harmed) by the contaminant

In the absence of one of these elements, on a given site, there is no risk. Where all three elements are present, risk assessment is required to determine the significance of the harm or pollution that is being or may be caused. As outlined above, the terms of the Contaminated Land regime specify that remediation need only be implemented where a site is causing, or there is a significant possibility that it will cause, significant harm, or that pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused.

Development of contaminated land is usually addressed through the application of planning and development legislation and guidance (i.e. NPPF). The suitable for use approach is regarded as the most appropriate basis to deal with contaminated land, taking account of environmental, social and economic objectives. The assessment is made in the context of the proposed land use.

Risk Classification Matrix

		Consequence			
		Severe (Sv)	Medium (Md)	Mild (Mi)	Minor (Mr)
Probability	High (Hi)	Very high risk	High Risk	Moderate Risk	Moderate/low risk
	Likely (Li)	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood (Lw)	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely (Ul)	Moderate/low risk	Low risk	Very low risk	Very low risk

After CIRIA Report C552, Contaminated Land Risk Assessment A Guide to Good Practice, 2001

Classification of Consequence

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem or organisation forming part of such ecosystem (note: the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health ("significant harm" as defined in DETR, 2000). Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem or organism forming part of such ecosystem, (note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000).	Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects of carbon dioxide
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the Draft Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

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